DIABETES ESSENTIALS
TRANSCRIPTS

HOSTED BY DR. BRIAN MOWLL
Module 1: Understanding Diabetes From A New Perspective
It’s time to re-think diabetes. In today’s module, you’ll learn how to see type 2 diabetes in a new way, and how to address the root cause using nutrition and lifestyle modification. We’ll cover the main types of diabetes, how they’re diagnosed and what to watch out for -- uncover the root cause of type 2 and pre-diabetes to control and master your blood sugar!

Module 2: Diabetes Nutrition - Cutting Through The Hype And Confusion
Today, we cover everything about diet and nutrition for blood sugar management, including the history of diabetes nutrition, ADA recommendations and what the research really shows about the best dietary strategies for management. Learn which foods to avoid and how to construct an optimal diet, including various strategies like plant-based and low-carb, ketogenic diets.

Module 3: The Diabetes Game Plan - How To Plan, Prepare, Shop, And Cook For Success
Today, you’ll find your core motivation and set effective short- and long-term goals toward better blood sugar and health. We’ll outline a detailed game plan for setting and achieving your goals, help you clean out your pantry and prepare your home for change, how to navigate the grocery store, plan your weekly menu and meals, and create a strategy for traveling, holidays, vacations and eating out at restaurants.
Module 4: Move Your Body - Using Physical Activity Strategies To Optimize Blood Sugar
Learn all about the 5 types of physical activity, how they benefit diabetes and blood sugar, and ways to incorporate them into your life. Today, we'll discuss the best strategies to set up, plan and start an effective physical activity program, as well as how to balance and schedule activity for long-term health and blood sugar control.

Module 5: Getting Checked - Using Labs And Exams To Stay Safe And Maintain Your Health
Today, you'll learn all about basic and advanced lab testing and the underlying mechanisms for diabetes, pre-diabetes and blood sugar problems, as well as the most important exams to protect your health. We'll discuss blood glucose self-monitoring in detail and give practical tips and strategies to make the process of self-testing simple and effective.

Module 6: How Stress Effects Blood Sugar And The Mental Side Of Diabetes
Learn how stress hormones, like cortisol and adrenaline, affect the liver and impact blood sugar levels. Today, we'll discuss the 3 major types of stressors, and how to evaluate and address them, including sleep problems. We'll also talk about the connection between diabetes, anxiety, depression and food addiction, and detail how to structure an effective stress management program to stay balanced and healthy.
Module 7: Medications & Supplements - The Biochemistry Of Diabetes Management
Today, you’ll get an overview of diabetes medications, including their actions, uses, benefits and potential side effects. We’ll also break down nutritional supplements, including nutrients, herbs, botanicals and other nutritional compounds; discussing what the research shows about effectiveness, dosing and usage. Learn how to work with your doctor to negotiate a good medication and supplement strategy.

Module 8: Working Through Challenges To Reach Your Goals And Stay In Control
Challenges are inevitable when dealing with diabetes and blood sugar imbalances. Today, learn the best strategies to prevent and solve problems so you’ll stay on course and in control. We’ll discuss how to build a comprehensive diabetes care team to get the support you need, including online and offline options to help you reach your goals and avoid major pitfalls.

Module 9: Special Topics - Exploring Interesting Ideas For Achieving Better Blood Sugar
Today, we’ll look at the latest research to improve blood sugar and beat diabetes, such as a plant-based diet, fasting, ketogenic diet and a very low calorie approach. We’ll challenge the status quo and discuss when and how to consider safely incorporating one or more of these techniques into your diabetes management program.

Module 10: How To Stay Motivated For Successful Long Term Blood Sugar Health
Learn to establish and re-evaluate your core motivation to stay anchored to your big why! Today, we’ll discuss how and when to update your goals, how to cope with “diabetes burnout” and how to understand, prevent and address self-sabotaging behaviors.
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188  Extended Interview with Stephen Ezell
196  Extended Interview with Sachin Patel, DC
204  Extended Interview with Robyn Openshaw
210  Extended Interview with Robert Silverman, DC, MS, CNS
216  Extended Interview with Robb Wolf
222  Extended Interview with Razi Berry
228  Extended Interview with Peter Osborne, DC, DACBN, PScD
234  Extended Interview with Nina Teicholz
239  Extended Interview with Niki Gratrix, BA, Dip ION, NANP
245  Extended Interview with Mike Mutzel, MSc
251  Extended Interview with Michael Murray, ND
258  Extended Interview with Melissa Kathryn, CHN
264  Extended Interview with Mark Menolascino, MD, MS, ABIHM, ABAARM, IFMCP
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280  Extended Interview with Marcelle Pick, MSN, OB-GYN, NP
285  Extended Interview with Lily Nichols, RDN, CDE
291  Extended Interview with Kirk Parsley, MD
301  Extended Interview with Kenneth Brown, MD
306  Extended Interview with Josh Axe, DNM, DC, CNS
312  Extended Interview with Joseph Pizzorno, ND
316  Extended Interview with Joe Cohen
324  Extended Interview with Jonathan Bailor
328  Extended Interview with Jolene Brighten, ND
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340  Extended Interview with Jill Carnahan, MD, ABFM, ABIHM, IFMCP
344  Extended Interview with Jeffrey Bland, PhD
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EXTENDED INTERVIEWS

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435  Extended Interview with Bret Scher, MD, FACC
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447  Extended Interview with Benjamin Bikman, PhD
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Modules
Dr. Mowll: Hello, and welcome to Module 1 of the Diabetes Essentials program, looking at diabetes from a new perspective. What if everything you were taught and believed about diabetes was wrong, or at least, incomplete? We’re told that type two diabetes is a progressive degenerative condition that gets worse over time, not better. And that the longer you have the disease, the more problems you’ll develop and the more medications you’ll need.

We’re told that by the time someone is diagnosed with type two diabetes, they’ve already lost 50% of their ability to produce and release insulin. And that over time, their pancreas will burn out, leading to a requirement for insulin injections. We’re told that for people with both type one and type two diabetes, complications are inevitable; serious problems like blindness, amputation, heart disease, stroke and kidney failure. And that the best we can do is to slow the progression of these problems by controlling blood sugar levels with medications and insulin.

We’re told that diabetes is genetic, and that for type two diabetes, it’s caused by being overweight or obese and lazy, that you brought this on yourself with a fast food diet and by sitting on your backside too much. We’re told that medications and insulin are required to help people with type two diabetes to control their blood sugar. And that using diet therapy, physical activity and lifestyle modification is helpful, but not enough to make a serious impact on blood sugar control. That if you have diabetes, you’ll be on medications for the rest of your life and
require more medications the longer you live with the disease.

**Dr. Murray:** Most often when people go to see their doctor and they’re having issues with their blood sugar and told they’re either diabetic or pre diabetic, the doctor is telling them, “You’re going to be on drugs the rest of your life.” I think that’s really bad information. I think information is a real great tool for anyone that has blood sugar issues, because with the right information and taking the right steps, you can reverse this condition in most cases. I think our medical system is based upon treating numbers and treating symptoms.

And when you treat numbers and symptoms, you’re not getting at the root cause and if you don’t get at the root cause, you’re never going to cure anything and very few of drugs really cure anything. They simply are biochemical band aids that make people feel better or change in number so the doctor feels better. But they don’t really address the underlying issue. And in many cases, they’re crippling to our physiology and lead to either side effects or a worsening of the disease we’re trying to treat.

**Dr. Mowll:** What if I told you that each of this apparent truth is really just a myth, a partial truth the best and worst, a dangerous misunderstanding, which leads to inadequate and ineffective treatment by even some of the most respected doctors, dietitians and health practitioners in the world. This, in fact, is the truth.

And in this program, Diabetes Essentials, I’m going to lift the curtain and teach you how to regain control of your blood sugar. Break free from the stress associated with diabetes and give you your power back to make the best decisions and take the best actions for your health.

My name is Dr. Brian Mowll, the diabetes coach. I'm a certified and master licensed diabetes educator, and certified by the prestigious Institute for Functional Medicine in the practice of functional medicine.

My journey with diabetes began almost 15 years ago with a one wonderful woman named Janice. I haven’t spoken to Janice in over 10 years, but she is indirectly responsible for this program, and for the thousands of patients and clients that I’ve been able to help since I met her. Janice came to a nutrition workshop that I was teaching at a local whole food store, back around 2003. After I finished speaking, she came up to me and told me her story. She was 57 years old, and had recently been diagnosed with type two diabetes.

Her father was diabetic and died of the complications of diabetes. And she did not want that same fate for herself. What could she do, she asked, to reverse the condition and prevent the serious problems from happening to her. At the time, I really didn’t know that much about
diabetes other than what I had learned in school. I told her to try to lose some weight, cut out carbs in her diet, start exercising, and to work on making her body as healthy as possible. She researched diabetes and bought and read every book in program that she could find.

Three months later, Janice returned to another workshop that I was leading. It took me a minute to realize who she was. Janice had lost over 30 pounds, reduces the inflammation in her body and had a glow apparent in her face that had not been there just a few short months ago.

She had completely transformed her health and seemed like, an altogether, different person. As Janice updated her story, she told me that she had been able to eliminate Metformin, the diabetes drug she was taking, as well as another drug called Actos. She also told me that her blood pressure, which had been high, normalized and that she felt better she had in many, many years.

Her story and the result that she achieved lit a fire inside of me. You know, almost 100 million people in the US and an estimated 1.5 billion people worldwide have diabetes or pre diabetes. Imagine if even 20% of them could achieve results similar to what Janice did. Janice’s experience showed me the power of the right diet and exercise, lifestyle modification as well to impact diabetes, improved blood sugar control, and to reduce the need for medication.

She gave me a new vision, one in which diabetes no longer controls us and where our diabetes care focuses on empowering people to fix the root cause of their blood sugar problems, instead of just suppressing glucose with medication. Within a year, I changed the focus of my practice, began learning everything that I could about diabetes, and set out with my new mission to change diabetes care for good.

Since then, I've had the privilege of working with thousands of patients and clients to help them achieve the dream that Janice showed me was possible. This program, Diabetes Essentials, is the gateway to everything that I've learned. Diabetes is not a simple condition, and there's no easy way to normalize blood sugar, at least not one that works long term.

In this program we'll address each of the key areas that are important for good blood sugar control. We'll discuss in depth what's known in diabetes education as the AADE7 self-care behaviors, healthy eating, being active medication use monitoring, problem solving, healthy coping and reducing risks. We'll discuss what the American Diabetes Association recommends, as well as the most current research and what it shows regarding the best diet and lifestyle approach to help regulate and control your blood sugar. And I'll lay out a step by step plan for you to regain control of your blood sugar, to nourish your body, and to give
yourself everything you need to have the best chance for healing and optimal health.

Let's start by exploring a little bit more about what we call diabetes. As you probably know, there are two main types of diabetes mellitus and a few others that are less common in normal blood sugar or fuel metabolism. Your body breaks down your food into its element parts; amino acids, fatty acids and sugars like fructose and glucose.

The pancreas releases a hormone called insulin, which opens the door to allow glucose to get into ourselves, which we can then burn for energy. The body maintains the level of sugar or, more accurately, glucose in the blood at about 83 milligrams per deciliter, or 4.6 millimoles per liter. That's only about four grams of sugar or less than a teaspoon of sugar in the blood at any given time.

Your livers store sugar as well and can release it when your blood sugar drops too low. This stored form of sugar is called glycogen. And the release of sugar from the liver is stimulated by several hormones, including the stress hormones, and as opposed by insulin. Think of insulin like a key which unlocks the door to our cells, and allows glucose to flow in.

That glucose is like gasoline that gets burned in our cellular engine for energy. When the amount of sugar in our blood gets too high, it causes damage to our blood vessel walls and to the cells of our body. This damage is called glycation. Glycation of cells in our organs and tissues is what leads to the complications or problems associated with diabetes.

**Dr. Bland:** Sugar is not bad. I mean, in your blood, we have this sugar called glucose, it fuels your cells. So it's not like it's a bad molecule, you have blood sugar in your body, you need so much to power all your cells. The problem really comes with the amount of sugar that we're administering to the body, which the body then has to manage because it can only tolerate so much.

So I asked the question, in a candy bar, a normal candy bar that now would cost 50 cents. I'm not sure I don't buy them, but I think somewhere in that range. How much sugar is there in a candy bar? And I say, well, let's just use some random numbers. Let's say that there is about an ounce of sugar, that would be a fairly small candy bar. And an ounce of candy bar would be about 30 grams of sugar.

And then I asked the question; in the whole of your body and your whole blood system, how much sugar is floating around there? And so he say, “well, it's about 100 milligrams.” So would be one 10th of a gram per hundred milliliters. So he say, “Well, I guess if there's five liters of blood, you do some calculation, you might say, well, five to 10 grams.”
And then I say, “Okay, but your candy bar, you’re eating 30 grams.” 30 grams, compared to your whole body’s amount of sugar in your blood, have five to 10 grams. So what happens when that all gets absorbed very rapidly after you’ve eat the candy bar? Well, it’s like a fire drill. Your body says, oh, my word, I’ve got to get the sugar put somewhere because if it gets too high, it’s going to produce all these problems. And therefore, I’ve got to call out the guard which is the fire department to get sugar put somewhere.

And so what it does is, it stimulates all the fire put off router is when your sugar is high, which is your immigrant system, your beta cells of your pancreas. And you secrete all this insulin, it rushes out in your body and glucagon and the counter regulatory hormones, it’s a very complex process. And it’s shoveling the sugar molecules in all sorts of places that would normally not absorb them at the level that they’re being pushed in.

And now what happen over time, by doing that repetitively, is you kind of wear out the system, and that's called insulin resistance or glucose resistance. And now, you just don't have enough things to call out the fire department. They're on vacation and they retired and they can't push the sugar anywhere and now you get hypoglycemia, which is diabetes.

But in the intervening period, you’re putting sugar in places in your body that shouldn't be like in your coronary arteries and into your kidneys and into your eyes and into your nerves. And so what do you start seeing as a side effects; neurological problems, ocular problems, vision difficulties, kidney problems, blood lipid problems, cardiovascular disease, even the brain.

What we now recognize -- the principal fuel for the brain is sugar/glucose. And so now it's having a problem with managing its energy. So this epidemic that we have is a consequence of just overloading the system with things that get absorbed so quickly and our body wasn't designed to manage on a repetitive basis that kind of exposure.

Dr. Mowll: In type one diabetes, the part of the pancreas which makes insulin is damaged or destroyed, so the body no longer makes insulin. Therefore, we’re missing the keys to unlock the cells and which turn off for liver’s release of sugar. In this case, blood sugar continually rises and can reach dangerously high levels very quickly and even become fatal.

This type of diabetes typically affects children or young adults and makes up less than 10% of all diabetes cases. There’s a version of this disease which can affect adults at any age called LADA. This can have characteristics of both type one and type two diabetes. In LADA or Latent Autoimmune Diabetes of Adulthood, the immune system is
triggered to destroy insulin and/or the pancreatic cells that make insulin leading to low insulin levels, and diabetes. In LADA, this happens later in life as an adult and progresses more slowly.

**Dr. Kushner:** The type one is the most common life threatening medication requiring chronic illness of childhood. And there are a million and a half people in the US with type one and 10 million people worldwide or more with type one diabetes, and they’re typically diagnosed as children. Some are diagnosed as adults, and they receive care in centers that have a comprehensive support, many of them, including dieticians, etc.

And the traditional way of treating and supporting type one diabetes has been with very precise amounts of carbohydrates. And so families when they’re diagnosed will be given these handouts, the sheets that describe quite precisely the number of grams of carbohydrates their children, or themselves should consume.

It's typically 45 to 55% of their calories from carbohydrates. And the problem with that is when you begin to replace back the insulin and at its core, the problem with type one diabetes, these people are missing the ability to make insulin. Early on they make a little bit, after a lifetime of type one diabetes, they make almost none at all.

And so they are mostly or almost entirely dependent upon injected insulin to stay alive, and the problem is figuring out the amount of insulin for the carbohydrates in the meal is incredibly difficult. And so most people I know don't walk around with Graham scales in their pockets or measuring cups in their purses, though I've seen people with type one diabetes do these things. And even when you go to that level of extreme, it's still very easy to make mistakes.

And so if you eat a large carb meal, and you think you know how much insulin that requires, afterwards, a couple hours later, it's easy to have your blood sugar be up to 500 milligrams per deciliter, or as low as 50. And that lends itself to feelings of frustration and fear and disappointment, and frankly, just disrupts your life.

And so it becomes really challenging to live with type one simply because the standard insulin to carb ratios are nowhere near as precise as they're claimed to be by most medical professionals. And my own journey around this basically came as a result of meeting people who live with type one, learning from them what they had learned to try to stay healthy and stay alive. And also using continuous glucose monitoring, in my practice and learning from my friends who had type one diabetes and watching their continuous glucose monitor, data strips.
And ultimately, I just came to the conclusion that a lot of carbohydrates was really complicated and dangerous for people with type one. And then the question goes, what else do you eat? And so, I ran across the book by Dr. Richard Bernstein, which is the Bernstein’s Diabetes Solution, which I just love. It’s a great book. And I began to meet other people who were interested in this topic, as well. And through my own practice, I essentially changed the way I practice focusing on reducing carbohydrates. And I've just found that it has utterly transformative results.

**Dr. Mowll:** In type two diabetes, which accounts for over 90% of the cases of diabetes, the pancreas still produces insulin, but the body cells do not use it properly. This is called insulin resistance. In the example I use before, in this case, we have the key, but it doesn't open the lock because the lock has been gummed up or damaged.

We still can't open the door, and we still can't get the glucose into the cell, where it belongs and where we need it. Type two diabetes and pre diabetes are characterized by insulin resistance. Think of someone knocking on the door to your home. They’re knocking but you don't hear them. Perhaps they try the key but it doesn't open the door. They respond by knocking louder, perhaps even shouting or banging on the window. Eventually you hear them you open the door. And let them in.

This is what happens when you have insulin resistance. When the cells become resistant to insulin, just like the person outside of your door starts knocking louder, the body responds by making more insulin to overcome the resistance. Since insulin causes your body to store fat, and prevents you from burning the fat that’s already stored in your fat cells, you start or continue to gain weight and have a difficult time losing weight.

Elevated insulin levels will also cause high blood pressure and can lead to additional stress on the body. This process can happen over many years and even decades, like termites eating away at the foundation of your house. The elevated glucose and insulin associated with diabetes can slowly damage your cells, organs and tissues, leading to serious complications and even death. In fact, eight out of 10 of the leading killers in the US are all associated with diabetes.

**Dr. Murray:** I think there are, you know, four key types of type two diabetics. You know, one is the classic thrifty gene patient where they start gaining weight around the abdomen. And collectively, these fat cells start acting like a tumor and they want to grow. And the way they grow is they start secreting compounds that block the action of insulin, that leads to kind of feeding that tumor, blood sugar levels go up, appetite goes up, and you get this big snowball effect of insulin resistance turning into type two diabetes.
I also think stress is a big issue for a lot of people and stress leads to elevations in cortisol, cortisol raises blood sugar levels. I think for many people, they don't get their blood sugar levels under control and until they get that stress issue addressed.

We have issues with various nutrient deficiencies, I think can also be a factor for some people. Those are easy patients to see as you take a look at their diet and maybe do some blood work and identify some key areas of support that can be provided. It could be something as simple as chromium. I have had patients with type two diabetes, it doesn't happen as much anymore.

But in the 80s and 90s, it was more common where you were able to just help someone get their blood sugar levels under control by making sure they had 400 to 600 micrograms of chromium per day. So sometimes nutrient deficiencies can be a factor. The last one, I think it's more difficult than -- I think it's probably the biggest factor, and we've talked about it. I think it's this ever increasing load in environmental pollutants.

When they did a study where they looked at the data from National Health and Nutrition survey; they looked at blood levels of various pesticides, herbicides, persistent organic pollutants is what these compounds are termed. And what they found was there wasn't a correlation between any single pesticide, herbicide and type two diabetes.

But when they lumped them together when they looked at blood levels of all of these compounds, they showed that the higher the level of these compounds, the more likely a person was to develop type two diabetes, and it didn't matter if they were overweight or not. And that's something that we've seen in the last 10 years, especially we're seeing more and more people with type two diabetes that aren't obese, that really aren't even overweight.

So what's going on? Well, what's going on is that these environmental toxins disrupt the cells ability to respond to insulin properly, so that means blood sugar levels are going to stay up. And that again, causes a domino effect or a snowball effect.

So when they look data, they found that by dividing people by weight, and their exposure to these toxins, that if someone was severely overweight -- if they were exposed to these toxins and had higher levels in their blood, they would have a 40 times greater risk of developing type two diabetes than someone who is equally obese, who had low levels of those compounds.

When they looked at people that were thin, they found the same thing. Somebody who was thin, who had high levels of these toxins had a
20 times greater risk of developing type two diabetes than the obese person; not being overweight, I'm talking about being obese, an obese person who had low levels of these compounds.

So it looks like from this emerging data that these environmental pollutants are playing a huge role in why we're seeing this epidemic of type two diabetes. It's a multifactorial condition. We have many different facets that contribute to type two diabetes; lifestyle, diet, and of course, I'm talking now environmental.

So we have to approach it differently based upon what seems to be the biggest issue for that particular patient. And there's some overlap, we always want to focus on improving the action of insulin, we always want to reduce the exposure to these toxic compounds, and we need to take steps to try and get rid of them.

When someone is really overloaded with these toxins, it's a much bigger challenge even if they're overweight, because if they're overweight and they have type two diabetes, we can often reverse it just by helping them lose a few pounds or achieve their ideal body weight. If they're overloaded with these toxins, it's a much longer proposition.

Dr. Mowll: Let's talk about what actually causes insulin resistance. Many people understand that they're insulin resistant and their doctors discovered insulin resistance as the cause of type two and pre diabetes, but most people have never asked what actually causes the insulin resistance to begin with. There are several key factors here.

First is inflammation. Several studies have shown that chronic systemic inflammation can interrupt the communication between insulin and its receptor, leading to insulin resistance. Inflammation, of course, is a normal process; a normal immune reaction to some sort of physical or chemical insult that should go away once that insult is addressed. However, chronic inflammation is more dangerous. It's a reaction to the constant physical, chemical, nutritional and emotional insults that we deal with every day.

It's this chronic systemic inflammation that clogs the insulin receptors, leading to insulin resistance. We'll talk throughout this program about how to reduce chronic systemic inflammation. Once our muscle cells start to become resistant to insulin, our blood insulin levels rise, which makes us more insulin resistant. Just like with drugs or alcohol, we can develop a tolerance to the hormone insulin, which desensitizes us to those hormones signals.

To make matters worse, insulin is a fat storage hormone. And elevated levels lead to more fat storage, particularly in the muscles, the liver, and of course, the fat cells. Eventually, this leads to fat accumulation in
the liver, called fatty liver disease, in the pancreas and in other organs, as well as in the muscles, which is known as ectopic fat. This extra fat disrupts hormones signaling even more and leads to greater levels of insulin resistance.

**Dr. Christianson:** So blood sugar is really about blood glucose, there's a bit of fructose round two, but when the liver is working well, its stores that effectively. And so what happens is that the liver becomes more able to store a lot of things in the form of triglycerides or fat inside the liver, and less able to store sugar safely and effectively.

So if someone can lower the amount of triglycerides in their liver, but have a healthy amount of glycogen, then they can reach a state in which they can have a stable steady blood sugar and better weight. And the thing is that, for some people, just weight loss can help but it doesn't always. And there's also a subset of people that's not heavy and still can go on to get type two diabetes. And that's the big link.

You talked about how we've got 80/90% have these compromises. And yeah, there are many who their weight is good, but they've lost a lot of lean mass, and they're not heavy but they're too flabby and they're not able to really regulate blood sugar effectively.

So the trick is really now, not just dropping pounds but dropping inches and getting the body able to store glycogen and have less triglyceride. As the body becomes more and more resistant to the effects of insulin, blood sugar slowly starts to rise and eventually can rise into the diabetic range. The more fat we store around the liver and pancreas and other organs, the more insulin resistant we become, and the harder time we have maintaining normal blood sugar levels. This is how type two diabetes and pre diabetes starts and then accelerates over time.

**Dr. Kharrazian:** If someone is diabetic, did they have a diet and lifestyle that justifies their blood sugar issues. So there are some people that come in and they go, “Hey, I work out all the time, I eat well, I have no idea why I'm diabetic.” That's a complete different patient than, “Do I really have to give up soda.”

**Dr. Mowll:** For sure.

**Dr. Kharrazian:** Okay, so right away, you categorizing it into -- for me, I categorize into; these are mechanisms that clearly indicate insulin resistance development, or they not. So if they're not, then your question is, why? One of the most common causes is autoimmune mechanisms. So later on even diabetes development in adulthood, that's coping mechanism.

So we check auto antibodies to their islet cell, see if that’s involved,
but another mechanism is -- you can just have significant amounts of inflammatory reactions and stress that regulate the insulin receptor, unrelated to just a diet that's high in sugar. So if someone is eating a very inflammatory diet, like I'll give you an example, the junk food vegetarian. And all they're doing is eating like fried food and lots of bad foods and the fats and all those things.

They could have inflammatory reaction, and even actually HbA1c is more of a marker for inflammatory reactions than it is for blood sugar itself. Remember glycosylated hemoglobin is a free radical reaction against red blood cells and the hemoglobin. So you don't have to have just high carbohydrate in your diet, you can just have an inflammatory type. So there are two different approaches. So there are some people that are so obvious like, “Hey, you just can't eat soda all day, and you can't eat them with sugar and you have to physically move.” Until you do that you have no chance. And then there's others like, “I'm already doing all that.” Then that's a complete different scenario. And then, you know, for most people, there's a mixture of both. So that's kind of how first approach is to managing diabetes.

**Dr. Mowll:** Diabetes is diagnosed by your doctor or clinician in several ways. Often it's picked up using a blood test called a metabolic panel or plasma glucose. If this number is between 100 and 125, this indicates pre diabetes, and a glucose level of 126 or higher is positive for diabetes.

**Dr. Christianson:** Some people their biggest elevations are after meals, but some, it's often most dramatic in the morning. And if we think that through, you know, that's not a matter of something that just rushed into the body and caused a big surge of blood sugar. What happens is that as we're sleeping, our brain still needs glucose. And since we've not eaten for a while, our liver releases that.

And ideally, your liver has got a healthy amount in stores that are not too much. And when it's asked to release glucose, it gives about what we need. But if the liver is too crowded with fuel and it's not working well, when your body asks it to release glucose, like just dumps out an extra bucket. You know, it's like, “Okay, great. I've got too much here and I'm going to unload this on you now.” And then we'll see the levels climb up in the morning. So yeah, morning fasting glucose is one real big sign of that.

And we think somewhere around mid 80s is healthiest. We talked about 99 is a threshold and normal, and 114 is a threshold of impaired glucose tolerance, 126 for diabetes. But if you're above mid 80s, low 90s, then that's a sign of liver dumping off too much.

**Dr. Mowll:** There are several other ways that diabetes can be diagnosed; a random blood glucose test with a glucose level of 200 or greater
indicates diabetes. And an oral glucose tolerance test with a reading of 142 to 199 is pre diabetes, with a reading of 200 or more indicating diabetes. Lastly, there's a very useful test called the hemoglobin a1c, or HbA1c for short; that tests, the percentage of glycation of the red blood cell hemoglobin, normal is less than 5.7%. If the test shows 5.7 to 6.4, that’s pre diabetes, and reading of 6.5 or greater is diabetes. Your doctor or a clinician or diabetes coach can help you understand these numbers as they relate to you and your health.

According to the United Kingdom Prospective Diabetes Study, each 1% reduction in A1C levels was associated with a 37% decrease risk of microvascular complications and a 21% reduction in the risk of any diabetes related complication or death. In other words, the lower your A1C test, the less chance that you'll develop complications of diabetes, such as kidney disease, high problems, sexual dysfunction, heart attack, stroke, dementia, and amputation.

**Dr. Fung:** If you think about the disease of type two diabetes, it’s really about just too much sugar, both glucose and fructose in our bodies; so it’s not just in the blood, but it’s all over our bodies. So if you take a medication like insulin, for example, that is going to force the blood sugar from the blood into the tissues while you haven’t gotten rid of the sugar. It’s still in your body. So you’re not going to get better over time.

And if you think about what we do for a lot of type two diabetics is that, we give them a drug like insulin. And then the main side effect, which everybody sort of knows, is that you gain weight. As you gain weight, you’re going to have worse type two diabetes, which is going to require more insulin, which is going to make you gain more weight.

So you’re constantly getting worse and worse. And guess what, that’s exactly what happens in the standard treatment of type two diabetes. And everybody knows that type two diabetes is actually a reversible disease. If people lose weight, then that diabetes very often goes away. We see it in our studies of bariatric patients. And you hear stories, people, “Oh, I lost 50 pounds, I got off my drugs.”

And nobody says, “Well, you’re just lying.” And obviously, if you lose weight, the diabetes goes away. So if those drugs are making you gain weight, you’re getting worse. And that’s why because they don’t get rid of the sugar, they just simply force that sugar into our body. So the way to understand type two diabetes is like, you think about your body like a sugar bowl. So over time, the sugar sort of goes in and it piles up.

At some point and the sugar come in and the bowl is full, it’s going to spill out into the blood. And that’s what you see, you measure it as high blood sugar, and then you get called diabetic. And so if you think about the actual disease, the wrong thing to do is to take that sugar, which
is what insulin does. It takes that sugar that’s in the blood and simply plumps it back into your body. And so you send that sugar sort of all over the place into your toes, into your kidneys, and over time, like 10 years, 20 years, all your organs actually just start to rot away because there’s just too much sugar. So if you understand that, really the disease is just about too much sugar, there’s only two things you need to know; one, don’t put more sugar in and that’s why we use low carbohydrate diets, and two, burn off that sugar.

If you let your body just use up that sugar, it’s just going to go down and down and down. And then after a while, you know the bowl is emptied abit, the sugar goes in, it doesn’t spill out into blood and all of a sudden you don’t have type two diabetes anymore.

**Dr. Mowll:** How did type two diabetes become such a widespread problem? At the turn of the last century, type two diabetes was still a fairly rare problem. Today, it’s one of the leading contributors to death and disease in the world. If we look at this chart, we can see that in the US incidence of diabetes began to increase dramatically in the mid 1990s. There are several events that may partially explain the explosion of diabetes rates at this time.

According to investigative journalist Nina Teicholz, our consumption of processed refined sugars, grains and vegetable oils drastically increased, as well, during this time. Combined with more stress and less active lifestyles, high calorie processed and refined foods did not compute with genetic history of Whole Foods and healthy fats, high quality proteins and fiber rich carbohydrates.

**Nina:** The Dietary guidelines really began in 1961, really with the American Heart Association because they were the first organization, anywhere in the world, to tell the American population to cut back on saturated fat and cholesterol, meaning mainly cut back on animal foods, in order to protect yourself against heart disease. That’s story of insulin Keys behind that, many people I’m sure your listeners and viewers know that.

And then the US government got into the picture in 1980. And that’s when they launched the US dietary guidelines that are currently sponsored by the USDA, HHS, which are two government agencies. And they pretty much just adopted the whole American Heart Association platform, which was at that point, anti saturated fat; cut down on your dietary cholesterol. You know, no egg yolks for you, no shellfish. And also low fat, like cut down all your fat. That was the thinking in 1980.

The food pyramid, that many people still remember, which was that big bottom slab was, you know grains and breads. And at that point, it was like eat seven to 11 servings of bread a day. And you know, the whole
idea was to try to increase your carbohydrates up to 50 to 60% of all your calories, because Americans in 1965 had been eating about 39% of calories which is carbohydrates. According to our health experts, we really needed to hike up the carbohydrates.

Well, 1980 year the dietary guidelines are founded, is the same year that the obesity epidemic; obesity in America going along like this in 1980, boom! Starts to climb up dramatically and rapidly, and diabetes a little bit after that. So, you know, you can't say that the guidelines caused that but there's quite a lot of evidence to build a case that having everybody increase their carbohydrates by, since 1970, 30% while reducing fat, because if you're cutting out fat, you have to replace it with something, usually it's carbohydrates.

All of our increased calories that we eat now are carbohydrates. And, you know, an easy way to understand it is, what do you do to fatten cattle, you feed them grains. What do you do to fatten people, you feed them grains, lots and lots of greens. And so this is basically the high carbohydrate diet that was given to America, completely changed our whole food supply. And now we are really seeing the consequences of that.

I wrote a book called *The Big Fat Surprise*, and it was all about the kind of the history of nutrition recommendations. And I spent nearly 10 years diving into the science and understanding all the clinical trials. And I went to the evidence base for the dietary guidelines that we all follow, and it was just shocking. I was like, “Well, where are all the studies that I've been looking for, where are they?” You know, NIH funded billions of dollars and taxpayer money meant to inform nutrition policy, they're not there.

So all that led me to want to try to reform our dietary guidelines, so that they are evidence based. You cannot ignore the randomized control gold standard clinical trials and you just -- I wanted to have guidelines that would at least cause no harm. Like, at least let's not have recommendations that are potentially making people fat and sick. You know, I think many of your viewers or listeners might think, “Well, that’s okay. I've fixed my health, fixed my family, we're okay. So what do we care about the guidelines?” And that is really the way that I kind of felt myself you know, my kitchen is good.

But the reasons to care about the guidelines, even for those of us who are fixing our own health, the guidelines turn out to be, as I discovered, really wildly powerful. Like, school lunch meals; what your kid is getting in school or what you get when you go to a hospital. You're trying to get better and they're feeding you, you know, bread and soybean oil. What you get in an elderly parent or relative in a nursing home, all that's based on the guidelines. What women and infant children are getting are those
food baskets for our most vulnerable populations, those have no animal proteins in them anymore. That's all being driven by the guidelines.

The military; we have a huge obesity problem in the military. What they eat is based on our guidelines. And you know, they currently have a system to try to decrease obesity in the military, based on our guidelines. You know, the big red don’t eat is above meat and the big red green, do eat is above the pasta dish.

So is that going to help reduce obesity in the military? Not from any of the science that we know. You know, every time you think about food package and you look at the label on the back, you’re like, “Oh, I want to make sure you heat that saturated fat cap.” And those percentiles on the back of every food package, that all comes from the guidelines. So they're just so hugely powerful.

Dr. Mowll: Look at this chart from the CDC, comparing both obesity and diabetes rates in the US from 1994 to 2000, and again in 2010. The dark red areas indicate the highest prevalence of obesity and diabetes. And you can see a massive increase in these problems from just the early 1990s. According to the CDC, by the year 2015, diabetes rates are expected to double or even triple. And according to a report by diabetes 2030, Dr. William Rowley predicts the cost of diabetes to rise 57%, costing the economy $622 billion. We’re clearly doing something very wrong to how we lived just 100 years ago.

Dr. Wolfson: Well, I think that there’s a lot of factors that lead people to develop type two diabetes, there’s a lot of factors that lead people to develop cardiovascular disease, and a lot of those factors are similar. So if we talk about nutrition and lifestyle, they can lead to diabetes, they can lead to coronary artery disease.

But I think pretty much in my experience, everybody with coronary artery disease has some amount of insulin resistance, or officially type two diabetes or elevated blood sugar. The elevated blood sugar, in and of itself, lead to toxicity of blood vessels. It damages blood vessel proteins, leads to blood vessel dysfunction, and then eventually to coronary artery disease. But the concept of insulin resistance where two things happen, the body is not making insulin enough, number one.

Then number two, the insulin it makes, the cells of the body are not responsive to it. That leads to all different types of factors, and that could be inflammation. That could be oxidative stress that can be lipid abnormalities as well. So abnormal levels of LDL, and HDL levels that are all so important when it comes to cardiovascular risk. So, we really have to take a very important proactive approach to make sure that we get rid of insulin resistance, and therefore, we're going to do our best to prevent coronary artery disease.
Dr. Mowll: Diabetes Essentials program outline a plan to help you reverse course on diabetes and blood sugar problems. We'll discuss diet and nutrition, physical activity, sleep and stress management, medications and nutritional supplements, and a variety of lifestyle techniques and strategies to regain control of your blood sugar, prevent complications, and optimize your health.

This is Dr. Brian, Mowll, the diabetes coach. And in Module 2, I'll help you to cut through the confusion of dietary dogma and reveal what the research really shows about how to use food to control blood sugar and support your health. I'll see you back next time.
Module 2
Diabetes Nutrition: Cutting through the Hype & Confusion

Dr. Mowll: Hello, and welcome to Module 2 of Diabetes Essentials: Diabetes Nutrition Cutting Through the Hype and Confusion. Diet and nutritional recommendations for diabetes can be really confusing. You may have been told by your doctor or dietitian to eat a moderate to high carbohydrate diet, consuming 40 to 60 grams of total carbs per meal in the form of whole grains, beans, legumes, starchy vegetables, and refined grain products like bread, cereals, and pasta.

Maybe you saw a video online about the miraculous benefits of a vegan or raw food diet, and how cutting out meat can transform your health overnight and lower your blood sugar levels. Perhaps a friend at work shared how they lost 20 pounds using a ketogenic style diet. Cutting out all carbohydrates and adding butter to their coffee for more energy and a faster metabolism.

Or it’s a possibility that someone suggested you try fasting, not eating at all. In order to lose weight and reduce your blood sugar. Liver cleanses, lectin avoidances, gluten-free diets, Weight Watchers or NutriSystem, Atkins diet, the list goes on and on. It’s enough to make your head spin.

Today I’m going to clear up the confusion for you and show you what the most compelling research tells us about using diet and nutrition to control and optimize your blood sugar.
I'm Dr. Brian Mowll, the Diabetes Coach, certified and master licensed diabetes educator, and IFM certified functional medicine practitioner. And by the end of this module and the Diabetes Essentials program, you won't be lost anymore. You'll have a clear picture of how to eat for better blood sugar.

**Cassie Bjork, RD:** I think it can be so confusing for people when dietitians are still teaching the low fat, low-calorie approach for weight loss. It's crazy. Even to this day the dietitians that I hire are coming from this training. This conventional training of following all of these old dieting rules and restricting the body.

When really, in fact, you know, and this is why I think our approaches align so well. Is that we have to be eating real whole foods and stabilize the blood sugars in order for the whole body to work how it should.

I will never forget either. I walked into my first annual nutrition and dietitian conference. And I saw this huge tent sponsored by Pepsi. They were sponsoring a calorie-counting campaign. And I was like, “Why would Pepsi be at this annual conference for dietitians?” Because this is where we get our continuing education credits.

And then I saw McDonald's, and then I saw Splenda. And that's when it all clicked to me that maybe my education isn't just based on science. The intertwining between the big food companies and the governing boards is really, really frightening.

And that's when I really started to dive into the research and see that a lot of the government's recommendations, as you know, for our nutrition and dietary guidelines aren't based on science. In fact, you have to follow the money. That's why this low fat, low-calorie thing happened. And that's why we've been blaming the wrong villain. We've been blaming fat when really we should be blaming sugar for the result of the increased prevalence of Type II Diabetes, and heart disease, and obesity.

But it all started back in the 1960s. There was a single study funded by the Sugar Research Foundation, anonymously funded. And it proved that fat caused heart disease. And they had sugar has zero to little effect.

And it was contrary to all other reputable research. And it was completely bogus. And the government knew this. Like the federal officials knew that it was flawed, yet they use this as a basis for policy. And you have to think like, “Why would they do that?”

I always think when something doesn't click you have to follow the money. So that's when I really started to dive into the research, and I
found that all of this – I was dumbstruck by all of the information that I discovered. Like maybe cholesterol really isn’t the villain that we thought it was. It’s actually an essential nutrient.

Like maybe higher fat diets are actually more beneficial than high carb diets, because of how they regulate blood sugar and insulin. And that’s when I also discovered that there’s so much more metabolism than just food and exercise.

We’ve got to look at all of the pieces of the puzzle. Your stress levels, and your hormonal levels, your thyroid function, and what supplements are you taking? And are you sleeping? The whole picture.

So that’s when I really started to apply these findings in my own life. As I questioned, why is the basis of the government’s recommendation carbohydrates? And if all of that supposed to work why does it seem to be backfiring? Like why is our nation getting sicker and fatter? It doesn’t make sense.

So I became a rulebreaker, and I quit the low fat, low-calorie diet. And I started to eat more. I had been running marathons trying to burn calories to lose weight, instead of just gaining weight. So I just stopped all of that. And I started eating whole real foods. And I started taking care of my body by doing the right types of exercise and eating more fat.

And my cravings disappeared. My energy levels went up. I lost 20 pounds, and it’s stayed off, and I’ve never looked back. And I felt more like myself again. I didn’t know what was happening at the time. Now I know that inflammation was being reduced, and my hormones were balancing out, and all of that research in my experience became the basis, the foundation, for our rulebreakers weight loss coaching program. Which looks at all of the pieces of the puzzle.

Dr. Mowll: Let’s start by looking at what the ADA currently recommends for people with Type II Diabetes and pre-diabetes. According to the 2018 ADA Lifestyle Guidelines, the ADA states that there is not a one size fits all eating pattern for individuals with Diabetes. And meal planning should be individualized.

They go on to say, “Evidence suggests that there is not an ideal percentage of calories from carbohydrate, protein, and fat for all people with Diabetes. Therefore macronutrient distribution should be based on an individualized assessment of current eating patterns, preferences, and metabolic goals.”

There are some specific recommendations in their guidelines, such as focusing on whole food carbohydrates, higher in fiber, with a lower glycemic load, avoiding added sugars, eating foods rich in
monounsaturated and polyunsaturated, omega-3 fats. Limiting saturated fats and restricting salt intake to 2,300 milligrams of sodium.

But they give quite a bit of latitude to personal dietary guidelines. Stating that there are, “A variety of eating patterns which are acceptable for the management of Type II and pre-Diabetes, including Mediterranean-plant based and low carb diets.” They specifically state that studies have shown that modest benefits with a very low carb, Ketogenic diet used therapeutically for three to four months. With all of the fad diets available to us today it’s important to get some historic perspective on using dietary modification to improve blood sugar.

In the ADA's *Diabetes Spectrum Journal*, dietitian and diabetes educator Franziska Spritzler writes, “After carbohydrates were recognized as the macronutrient primarily responsible for increasing blood glucose, severe restriction was used to manage hyperglycemia before the discovery of insulin in 1922.” According to a 2005 paper in Nutrition in Metabolism prior to the advent of exogenous insulin for the treatment of Diabetes Mellitus in the 1920s, the mainstay of therapy was dietary modification.

Diet recommendations in that era were aimed at controlling glycemia and contained approximately five percent of energy from carbohydrates. Twenty percent protein, and seventy-five percent fat. The diet recommended by Dr. Elliot Joslin, namesake of The Joslin Clinic, and author of *The First Modern Medical Text on Diabetes*; consisted of “Meats, poultry, game, fish, gelatin, eggs, butter, olive oil, coffee, and tea.” Clearly, the diet consumed by most people with Diabetes today is vastly different.

**Eric Westman, MD:** Well, the system that I use is rather simple. And it's using real foods, no additives, no extra oils, and things like that. And it really predates the whole idea of using macros, using apps to figure 80 percent, or 70 percent, 60 percent fat. And so I don't think we know what the optimal macro for fat is protein and carbs. I think you can do your own personal experimentation to try to figure it out. But in our research that we've done, it's a range of fats from 60 to 80 percent, some 70 percent.

But if you eat real foods that our message is to keep the carbs really low, and the fat will join the proteins: the meats, the poultry, the fish, and shellfish, and eggs. And so don't add extra fats. And that works for most people. Because the appetite goes down. People start burning their own body fat, and there just seems to be a corrective diet for so many things. Without worry about the percent of fat that you're eating.

Once I got into the depths of understanding, everyone was worried about eating the fat, and all of the cholesterol changes, and all of that. But now 15 years of research has been done, and it shows that
it actually looks good when you cut the carbs and eat more fat. And the difference is you get great glycemic control. Which means your triglycerides go way down. Your good cholesterol goes way up. And it turns out that it's a safe diet just for healthy eating.

And gosh, now that research can be done, if you put mice on a Keto diet at middle age they live 13 percent longer than if they were eating regular carbohydrate containing chow. So it might even if this extrapolates to humans, it might be that you could even live longer on a Keto diet.

So in the last 20 years, it's gone from, it's going to kill you tomorrow if you do this to you might even want to do this forever because it'll make you live longer. That's a big transformation.

So the mainstream systems in place with the treatment of Diabetes and other health problems for basically the use of medications, I kind of see today's medical world as a medication treatment system. And LCHF or Keto is disruptive; it means you change the food. Which we're not taught about in medical school, and then you actually take away medications. So it actually goes against what most doctors have been taught today. And that's why we're working on programs that are outside the main medical system. Because we just can't wait for more people to know about this.

I trained in internal medicine. So I got some knowledge about treating Diabetes with medications, and then pills, and insulin, and all of that. It was quite a surprise to me when I was getting the research to fill in the history of this. That 100 years ago, doctors were using the Keto diet, basically, LCHF diet, for treating Diabetes. And so I was actually reassured that before there were any medications to treat Diabetes doctors were doing what made sense to me. Which is just don't eat and drink sugar.

Starches get digested to sugars, so limit the starches. So if doctors didn't have medication, it would make sense to cut the carbs to treat Diabetes. And essentially, that's what I'm doing today. So I have a little browning book table from 100 years ago, and I pull it out. And go, “You know, look here's what doctors used.” “Really?”

It's a ten gram per day carbohydrate diet to treat Diabetes and obesity. And it's the Osler Textbook of Medicine which makes every internal medicine doctor sit up a little straighter. The father of internal medicine. And so it was just forgotten through the whole you've got to have carbs. And you've got to treat Diabetes with medications, and not diet.

Today it's become clear to me that if you do eat a higher carb diet and go on medications, that means that you're always going to have Diabetes. It basically has locked you into a lifetime of Diabetes, when if
you cut the carbs out and reverse the medications, you can actually treat and eliminate the Diabetes. So the very thing that we think doctors think is helping the Diabetes is sentencing them to a lifetime of Diabetes.

**Dr. Mowll:** So let’s talk specifically about what to eat and maybe more importantly what not to eat. There are three major macronutrients. Carbohydrates, fat, and protein. And it’s important to have some healthy balance of these three at each meal.

The AADE states, “Carbohydrate-rich foods have the greatest immediate effect on the blood sugar levels.” And that there’s, “No ideal amount of carbohydrate for all people with Diabetes.” In my experience over the past 20 years I’ve found that to achieve optimal blood sugar control, it’s essential to limit carbohydrate intake. The research backs this up as well.

According to a review in the *British Medical Journal* in 2015, there have been more than 74 randomized controlled clinical trials on the low carb diet since the year 2000. And that, “A meta-analysis and critical review have concluded that low carbohydrate diets are better than other nutritional approaches for controlling Type II Diabetes.”

One of these peer-reviewed published review analyses called dietary carbohydrate restriction as the first approach in Diabetes’ management. Shared 12 compelling points of evidence supporting why a low carb diet should be the primary approach to treating Type II Diabetes.

In one trial in the low carb Ketogenic diet in people with Type II Diabetes published in the journal *Nutrition* in 2012, the authors reported, “In summary, the low carb Ketogenic diet had significant positive effects on body weight, waist measurement, triglycerides, glycemic control in participants with Type II Diabetes.”

In a recent study performed at Indiana University by Dr. Sarah Hallberg, found that a low carb Ketogenic diet was effective to, “Support adults with Type II Diabetes to safely improve hemoglobin A1C, weight, and other biomarkers while reducing diabetes’ medication use.”

**Sarah Hallberg, DO:** I mean as far as carbohydrate restriction with Type II Diabetes, it’s well-known that that is effective. And when you look at the literature out there, what definitely seems to be correlated is that the lower that you go in the carbohydrates, the more effective it is at Diabetes’ improvement and reversal.

And so our nutrition approach is built on really decades of research by two of Virta’s founders, which are Dr. Jeff Volek and Dr. Steve Phinney. And so our nutrition approach with our patients who have Type II Diabetes or pre-diabetes is carbohydrate restriction. That is intended to induce nutritional ketosis.
Now the thing is we live in a carb-centric world. And we've been told to eat a low-fat diet for a long time. So telling someone to restrict their carbohydrates, explaining why physiologically that makes sense is one thing. But leaving them alone to be able to implement this in all way as in aspects of their life, is something that is very challenging. And so what we have to do is bring technology into the mix to help give people the support they need.

**Dr. Mowll:** Think about it this way; pre-diabetes and Type II Diabetes is considered a condition of impaired glucose tolerance. Imagine if you had a friend with Celiac Disease, which is characterized by gluten intolerance. Who asked you how much gluten they should consume? If you knew that it was destroying their health, would you tell them to just eat it in moderation? Of course not. However, that's what many well-meaning doctors and dietitians are telling their patients.

You can eat carbs and sugar, glucose, just make sure you balance it with insulin and medications. No offense meant to my colleagues, but this just doesn't make much sense. They knew this fact before insulin was made available in the 1920s and we still know it today. And unfortunately, ignoring this fact has done incalculable damage to people with Diabetes over the years.

**Ivor Cummins:** Too much fat in the diet combined with too much refined carb as a combo, by all means is a really bad combination. I mean, a doughnut is the classic example, right?

But if you take away the refined carbs and sugars and you have high fat in the diet, in the absence of much carbohydrate, that’s a completely different technical scenario. And we have these scenarios in engineering too where things have a very high dependency, and this is one of them. So high healthy saturated fat and fats is only healthy in the absence of refined carbohydrate. And excessive carbohydrate.

So I always quote professor Volek's excellent study. Where he got two groups of people, who are overweight with metabolic syndrome, so the perfect people to show what a bad diet might look like. And they put half of them on a healthy high carb diet, food pyramid, healthy diet. Not sweets and *Coca Cola*. Really healthy. And that had a very low fat and saturated fat in the diet.

They then took the other group and gave them three times the saturated fat and a very high fat Keto diet with low carb. And that second group maxed out on good bloods in the following weeks. They had dramatically better blood markers than the guys on the standard diet. And even though they were eating three times the saturated fat, I think it was 36 grams a day. It was a lot. Their blood fat levels were much better than the people on the healthy government diet. They had lower
blood fats. So it seems counterintuitive. But the high fat in the presence of the low carb allows your body to become an excellent fat burner. And you end up with lower blood fat, lower insulin, lower blood glucose, higher adiponectin, lower leptin, lower inflammatory markers.

I mean, Volek measures it all. And he showed a profile of excellent lower of inflammatory markers, and everything that matters. HDL went up, LDL actually stayed around the same. So it's an important concept to know. That higher healthy fat diets are only healthy if you don't swallow them down with carbohydrates, especially refined carbohydrates or sugars.

**Dr. Mowll:** Before explaining the details of how to optimize your diet for blood sugar control, we need to dispel another big misconception. The calorie myth. Calories are units of heat or energy generated by the metabolism or breakdown of food. Each food gives us a unique amount of energy based on its macronutrient content, fiber, and other factors. Scientists assign calories to foods based on experiments done using a machine called a bomb calorimeter. The research responsible for telling us how many calories are in our foods was done in the 1800s. And we assume today that it's accurate and applicable. But have you ever noticed that your weight will stay fairly constant regardless of how much you eat or exercise on one particular day? People have done overfeeding experiments, and shown that consuming thousands of extra calories per week does not, as expected, lead to massive weight gain.

Why not? Because the calorie theory is not exactly right. Yes, calories exist and can be measured in a closed static environment. But that's not what the body is. The body is dynamic and adaptive, and there is no way to accurately measure the amount of energy you’re consuming in the form of calories from each food or meal.

One scientist at the Institute of Food Technology says our current model, “Provides only an estimate of the energy content of foods. But determining the real caloric value of a food item requires actually feeding experiments.”

To make matters worse, our energy output, called our metabolic rate, is always changing, adapting, and fluctuating as well. So like calories in, there's no way to accurately measure our caloric expenditures either. Other than direct calorimetry, which is expensive and impractical. So if we cannot accurately predict the amount of calories we burn, and we can't accurately account for the energy in the food we eat and absorb, then why should we spend time and energy counting calories? The answer is simple. We shouldn't.

There are five keys to eat for better blood sugar control for people with
Type II or pre-Diabetes. If you have Type I Diabetes or are dealing with low blood sugar, you may want to consider an alternative strategy, which is beyond the scope of this particular training. These five strategies, these five keys are: number one, limit your carbohydrate intake; two, do not overeat; number three, be careful with snacking; fourth, use a restricted eating window; and number five, eat mindfully.

When consuming carbohydrates, the AED recommends focusing on vegetables, fruits, whole grains, legumes, and dairy products. Eating high fiber, low glycemic carbs, and reducing added sugars. This is a step in the right direction. But I found that even whole grains, legumes, and certain fruits will raise blood sugar in many people with Diabetes. As they go on to state, “Monitoring carbohydrate intake along with blood sugar levels is key to achieving blood glucose control.”

For most of my clients, I recommend focusing on non-starchy, above-ground fibrous vegetables, low glycemic fruits, and nuts, and seeds. These include vegetables like broccoli, cauliflower, asparagus, green beans, mushrooms, cucumbers, celery, tomatoes, bell peppers, garlic, onion, Brussel sprouts, cabbage, and leafy greens. Like spinach, kale, collards, and others.

Sweet and starchy vegetables such as beets, carrots, sweet potatoes, white potatoes, radishes, yams, and winter squash should be limited. Fruits can be tolerated in moderation by most people with Diabetes. It should be limited to low glycemic varieties, like berries, raspberries, blueberries, strawberries, blackberries, cherries, and citrus fruits like lemon, lime, and grapefruit.

If you want to enjoy some watermelon or mango occasionally, that’s okay. Just consider it a once in a while treat. Depending upon your personal carbohydrate tolerance. You may need to limit or avoid fruit altogether. Keep in mind that fruit was traditionally only eaten during the summer and fall. And many experts believe that the purpose of fruit was to fatten us up for winter with all of that extra sugar and those calories in the sweet fruits. Fruits such as olives and avocado are low in sugar and starch, and high in healthy fats and can be eaten regularly.

Clearly processed refined grains have proven to be disastrous for blood sugar and Diabetes. Bread, pasta, pastries, doughnuts, cereals, cookies, and flour-based products should be completely avoided. As well as juices, and sodas, and other sugary foods and drinks.

Whole grains, however, have somehow escaped criticism by most conventional nutrition authorities. On further examination though, whole grains offer little benefit and pose a significant risk for those with Diabetes and blood sugar problems. Consider the darling of all grains, oats. One cup of oats contains 300 calories and is 70 percent
carbohydrate. In fact it has 50 grams of carbs with only five grams of fat. Remember that of the three macronutrients, carbohydrates raises blood sugar the most. And fat raises blood sugar the least.

While a cup of oats does contain eight grams of fiber, which can help buffer the blood sugar, and reduce cholesterol, and triglyceride levels. That’s less than 15 percent of the carbs present. So it’s still contains way too much starch. A simple pre and post-meal blood sugar test will show you everything you need to know about oats and other whole grains. Most people who test their blood sugar before and after eating oats and other grains report a huge sugar in blood sugar levels from that food. This is not safe, nor is it smart.

Other grains such as wheat, barley, and rye contain gluten, lectins, and other problematic antinutrients, which can irritate the digestive tract leading to inflammation. They are also loaded with starch. Gluten free grain such as rice, corn, and millet are also very high in carbohydrates compared to fat and protein. And will typically cause a sharp spike in blood sugar levels.

Dr. Peter Osborne: Not only has gluten been implicated in the cause of Diabetes Type II but also in the cause of Type I Diabetes. So whether you’re Type I or Type II, gluten actually can trigger an autoimmune response that can lead to either one of those types of conditions.

So that’s from a gluten perspective. Of course, gluten can also cause leaky gut. So it can basically rip a hole in your gut, microscopic holes. Which then although for bacterial waste and other types of compounds to leak into your bloodstream and create chronic inflammation.

And of course, if you’re trying to battle Diabetes and maybe you've already got a diagnosis. If you’re trying to battle it you’ve got to get inflammation under control. So if you’re eating grains and you’re constantly creating inflammation. What that does is it elevates cortisol, and your cortisol causes weight gain. It causes water retention.

So again, if you’re trying to fight Diabetes, you’re trying to lose weight, most likely. You’re trying to reduce the inflammation. Reduce your risk of heart disease. So we don’t want to eat a food that’s going to be promoting of that inflammatory process longstanding.

But then some people say, gluten aside, right? What are the other things in grains? Why would we want to cut grain out? One of the biggest reasons is the carbohydrate content. Very, very high carbohydrate, especially grains like wheat. Which have a greater insulin response than sugar.

So if you’re eating your wheat mix, or your Wheat Chex, or whatever it
is that you like for breakfast cereal, not only are getting a heavy dose of carbohydrate through that dairy that you’re using. But you’re getting a heavy dose of carbohydrate through that grain-based cereal item.

And then there’s another big one that I think it’s maybe important to mention. It’s the omega-6/omega-3 ratio of grain. When you eat a lot of grain, it drives up the omega-3 fats. Omega-6, omega-3 for those of you listening who don’t know, omega-3 fats help our bodies cope, deal, and adapt with inflammation in a healthy way. They are also very critical for brain health, cognitive function.

So when you eat a lot of grain, you’re actually not eating very much omega-3 at all. There’s virtually little to no omega-3 in grain. But there are large quantities of omega-6 in grain. And omega-6 is promoting inflammation. So going back again to what we talked about with gluten. Gluten promotes inflammation. High levels of omega-6 promote inflammation. So it’s very, very hard to overcome a diabetic situation if your body is being inflamed every time you eat.

So one of the things in grain, commonly found in grain is mold. It’s a very big problem. The way that grain is farmed in our country it has to be stored. And mold tends to grow in it. And a lot of people are allergic to mold. One of the things I do very commonly is test all of my patients for mold allergy. Because if they’re mold-allergic they could be responding and reacting to grain, and it has nothing to do with gluten. They may not be gluten sensitive, but they may mold reactive.

But mold also produces a metabolite called a mycotoxin. So think of it as mold poop. It’s like the mold creates a chemical toxic compound that also creates inflammation. So a lot of grains are very, very heavy in molds and mycotoxins.

Then you have pesticide like glyphosate. This is not exclusive only to grain. Like we get glyphosate, there’s glyphosate in a lot of products. And there are a number of studies that have been coming out recently. For example, where we’re finding a lot of mycotoxins in cereal-based products. We’re finding mycotoxins even in non-cereal based products.

Wine is a great example of heavy, heavy mycotoxin concentration. A lot of people, even with Diabetes like to enjoy a glass of wine because their cardiologist said have a red glass of wine. Because it’s heart-healthy. And they don’t realize they’re getting, not only is it going to drive up their insulin, but it’s also going to expose them to that pesticide.

Which glyphosate itself can cause inflammation; it can cause mineral deficiencies. Like selenium deficiency. It can interfere with your serotonin metabolism. So it makes people depressed, it can. And it can also slow down the gut because the gut needs serotonin as a chemical to have
proper bowel motility or movement. So the movement of the gut. So glyphosate and other pesticides can be highly, highly inflammatory.

A lot of diabetics because they don't just develop Diabetes. It's not just like, “Hey, today I have Diabetes, and yesterday I didn't.” It's a very, very slow, steady process of damage. Accumulation of damage over time. And then they finally get a diagnosis. But before that a lot of them have already had a diagnosis of high blood pressure. They've already had a diagnosis of other types of things like high cholesterol. We won't talk about cholesterol. I have a totally different belief system than most people on that.

But they're on medicines, right? And drugs like the diuretics for blood pressure medication, or ace inhibitors, or angiotensin receptor blockers. These drugs cause CoQ10 deficiency and Zinc deficiency, and B Vitamin deficiency. And so when you don't have adequate quantities of these nutrients. For example we use CoQ10 because metformin, which is also a medication that a lot diabetics are prescribed. Also causes CoQ10 deficiency. Well CoQ10 deficiency causes congestive heart failure. Causes elevations in blood pressure. Reduces the body's ability to fight inflammation. So, therefore, increasing inflammation. It's an antioxidant.

So a lot of people that have gone through that route of multiple medications before they hit their diagnosis of Diabetes, they're on these medicines that are creating nutritional deficits that are supporting higher levels of inflammation in their body not even aware of it.

**Dr. Mowll:** It's also important to watch out for hidden forms of sugar and starch. Such as cornstarch. Sauces, salad dressings, condiments, and packaged foods like yogurt and peanut butter.

Nuts and seeds are an excellent source of fiber, healthy fats, protein, and nutrition. For example, once ounce of almonds contains about 160 calories and only about two to three grams of net carbs. With six grams of protein and three and a half grams of fiber. They're also high in Vitamin E, manganese, magnesium, and healthy monounsaturated fats.

This is true for most nuts and seeds. Including walnuts, pistachios, pecans, brazil nuts, cashews, peanuts, and seeds. Like flax, chia, pumpkin, and sunflower. Beans and legumes provide healthy fiber, protein, and are a good source of nutrients, including antioxidants, and vitamins, and minerals.

Such as copper, folate, iron, magnesium, manganese, phosphorus, potassium, and zinc. On the other hand beans also contain quite a bit of easily digestible starch. Which can raise blood sugar in many people with Diabetes. So it's best to limit beans to no more than one-half cup per serving. I typically recommend limiting net carbohydrates to no more
than 15 to 20 grams per meal. And 40 to 70 grams per day during the therapeutic period. And then gradually adding more starchy vegetables over time.

To calculate net carbs, look on the nutrition label, or find the nutrient facts for that food online. And subtract the fiber from the total carbohydrates. This will give you net carbs per serving. Next you will want to inspect the top of the label to see how many servings are in each container.

Protein is another essential nutrient and can be very important for blood sugar regulation, appetite control, lean muscle maintenance, healthy neurotransmitter production, and detoxification. The best sources of complete proteins come from healthy, clean organic animal products. Fish, chicken, and turkey, shellfish, beef, pork, eggs, and dairy are all excellent protein sources.

Many people struggle with dairy products such as milk, cheese, and yogurt. Causing inflammation due to an immune response to the casein protein found in cow’s milk. If you’re sensitive to these foods, it’s best to avoid them. And choose other protein sources. It’s also important to note that milk and yogurt contain a substantial amount of sugar from the natural lactose in milk. This can raise blood sugar in many people with Diabetes. Cheese on the other hand is virtually carbohydrate free. So if you are not sensitive to casein it can be a better option.

Although protein is an important macronutrient overconsumption of protein can lead to inflammation. An increase in uric acid production. And can have a negative impact on blood sugar. Unless you are highly active, very muscular, or have additional protein requirements it’s best to limit protein to .8 to 1 gram of protein per kilogram of body weight per day. For 160 pound person that’s about 58 to 73 grams of protein per day. Each ounce of meat has approximately six grams of protein, and an egg also contains about six grams of protein.

Robb Wolf: I think a safe starting point and a safe bottom level, and again this is for general metabolic health. And maybe improving say like Type II Diabetes issues. I would say the bottom is .8 grams of protein per pound of lean body mass.

You can make an easy case for going as high as 1.0 to 1.2 grams of protein per pound of lean body mass. And I don’t think you see much of a case for going much higher than that, other than in a scenario like a protein-sparing modified fast. Which can be very efficacious, but you feel horrible. It’s a short term intervention.

People will sometimes use a protein-sparing modified fast if they’ve hit a plateau, and they are trying to goose things along. People will often times do it also when they look at the clock, and they’re like, “Wow the
class reunion is coming up in a week, what am I going to do to look as good as I possibly can for that even?"

But those are pretty good bounds like both upper and lower bounds. So the upper end, generally I would be hard-pressed to see a need for more than like 1.2 grams of protein per pound of lean body mass. Probably most people would do well at that one gram per pound of lean body mass. And then the .8 is probably the bottom end.

And so for me, I'm about 170 pounds, about ten percent body fat. So that equates to about 150 grams of protein a day. Some days I get 120. Some days I get 180. So for me it's a little bit of a variable thing there. I do base it a little around activity level, and if I go out with some friends. Like we went to a Brazilian barbeque last night. I guarantee you I was probably closer to that 180 level than I was the 120 level. Even though I only had two meals that day. Like I shut that place down.

But then today I was actually not hungry and had less protein. And so I go a little instinctually and really let appetite kind of drive the boat on that. But I also make a point if I'm hungry and I'm kind of thinking about a snack. I do protein first versus fat first.

**Dr. Mowll:** In addition to carbohydrates and proteins, it's important to focus on healthy fats. From foods like nuts and seeds. Olives, butter, and cheese, avocado, eggs, fish, and coconut.

In Module 1, I mentioned that refined vegetable oils have been linked to the dramatic increase in obesity and diabetes rates. Since the 1950s and 60s. This is mostly related to their high consumption of omega-6 polyunsaturated oils. Which are easily oxidized or damaged, and pro-inflammatory. Oils are also a concentrated form of energy that does not exist naturally in that state. It's best to limit or avoid these oils. Focusing more on whole food fat sources. Like the ones I just mentioned. If you need to use an oil for a salad dressing or sauce, olive oil and avocado oil are good choices. For cooking, it's best to use a naturally stable fat. Such as coconut oil or butter. And people following a low carb dietary approach, fat will make up the biggest percentage of calories.

Other healthy fats include those found in naturally raised animal products. The mono and polyunsaturated oils from nuts and seeds. And certain fish like salmon, herring, and mackerel. Dietary cholesterol and saturated fat were once thought to be a dietary evil that needed to be avoided or strictly limited. However, based on more current research, nutritional authorities now recognize that dietary cholesterol is not a problem. And saturated fats have been at least partially vindicated.

Over the past several decades, researchers have found that the connection between saturated fats and cardiovascular disease is weak
at best. One paper reported, “From the original Framingham study to the Women’s Health Initiative as well as more than a dozen additional studies have failed to show an association between dietary lipids and risk for cardiovascular disease.”

Even though the FDA approves the use of several non-nutritive or artificial sweeteners, I typically do not recommend using them. Studies have shown that artificial sweeteners can trigger food cravings and they harm the delicate gut bacteria. Called the microbiome, which plays an important role in weight management and blood sugar regulation.

If you want to use a sugar-free sweetener I recommend using stevia, monk fruit, erythritol, and oligosaccharides. Fructose should also be limited due to its effect on the liver. Several studies indicate that high fructose consumption in the presence of insulin resistance and a lack of physical activity may lead to non-alcoholic fatty liver disease. And aggravate Diabetes and pre-diabetes. This can be found soda, added to packaged foods. And is present actually in many fruits naturally.

**Dr. Alan Christianson:** When we did like a cellular analysis on a microscope of cells from someone who has fatty liver disease. You can see how the cells are completely filled up, and they're crowded. The cell nucleus, which does a lot of important things, that's jammed in one corner. The glycogen is all compressed, and it's just full of these steatohepatitis. It's full of all these fat globules everywhere. So it's exactly what it is.

And you've educated people a lot about how Diabetes is not you’re perfect, you’re perfect, you’re perfect now it’s a problem. It’s a continuum. And fatty liver is the same thing, but it’s not really gotten the attention that it deserves. There’s a threshold by which when your liver is more than five percent fat by weight, now we define that as a problem.

But 4.9, two is better than 4.9. So that’s also a continuum. So it's actually really easy to burn the fat. Any way you lower total food intake. You can burn liver fat. But the pitfall is that if you’re not replenishing glycogen as well then those gains will not be long-lasting and will often reverse pretty easily.

So that’s why it takes more nuance than just less food or just fasting. Just consuming nothing. And we see this too amongst diabetics. If they just do prolonged fasts, they may not get healthier. They have their blood sugar get higher and higher from that. And that's the issue behind that.

So to help to maintain or restore glycogen, it takes a certain amount of healthy proteins along with some good nutrients to support liver function. And then a good diversity of fibers and things that help the
flora to regulate the blood sugar and help the liver repair itself.

**Dr. Mowll:** As mentioned earlier, eating a diet high in fiber can help delay glucose absorption, stimulate gut hormones, which lower blood sugar. And lower cholesterol and triglyceride levels in the blood.

The Joslin Diabetes Clinic recommends that people, “Should eat between 20 and 35 grams of fiber each day.” A study in the *New England Journal of Medicine* showed that people with Diabetes who ate 50 grams of fiber a day, particularly soluble fiber. Were able to control their blood glucose better than those who ate less.

**Vincent Pedre, MD:** I think that gut health is the missing link with metabolic syndrome and Diabetes. And the interconnection happens with the compromise of the gut barrier.

So things like antibiotics, pesticides, toxins, even regular over the counter medications that people take every day. Like an ibuprofen. These things increase the permeability of the gut barrier. So they make what we call leaky gut as the more colloquial term. And what happens with that is that then you allow for things to get through more easily.

And what's significantly connected to Diabetes or metabolic syndrome, because all of this precedes. The metabolic syndrome, then obesity, then Diabetes is a rise in lipopolysaccharide in the blood. And what is lipopolysaccharide? We call it endotoxin. It was endotoxin because it was initially discovered as being part of the cell wall coating of gram-negative bacteria.

Interestingly now I'm learning that there is also another toxin that comes from gram-positive bacteria that's called MDP or muramyl dipeptide. And that also can increase inflammation in the body. So we know that every disease is connected to inflammation, and then also mitochondrial dysfunction.

So lipopolysaccharide or these endotoxins they stimulate receptors in the cells that turn on a cascade of inflammation that then causes a whole bunch of inflammatory issues. But we see the connection. So studies that have looked at lipopolysaccharide levels rise, and they precede the onset of obesity and Diabetes. We know there's an element of this after you eat, especially if you're eating a standard American diet. That's going to cause much higher rise in lipopolysaccharide.

And then there's questions about which oils to eat that might relate to that. But the really interesting connection here is with the type of bacteria that are living in the gut. And there's flora that we know is more favorable that produces these byproducts; they're called short-chain fatty acids. The primary one being butyrate, which is key, key product.
Because it keeps the colon cells healthy, they use it as their primary source of energy.

But interestingly, butyrate also gets absorbed into the circulation and helps with insulin sensitivity. And it influences gene expression. But there is another group of bacteria. They were just discovered like in the mid/early 2000s, so we didn't even know that this genus existed. And it's the akkermansia muciniphila. And turns out people with low akkermansia muciniphila are going to be at higher risk for Diabetes, and for gaining weight, and for metabolic syndrome.

There's something that it does to keep that gut barrier healthy, and it feeds off of the mucin that is secreted from the lining of the gut. So there's this really important symbiosis that is occurring there that helps us maintain blood sugar. So then the question when you look at all of this emerging research is metabolic syndrome, is Diabetes, an illness of the pancreas, or is it really a gut illness. And is it starting there. And then all of these other things that happen from the chronic inflammation. Like mitochondrial dysfunction, mitochondria being the energy centers in every cell. And we know that there's an element of mitochondrial dysfunction that happens in Diabetes as well.

Those are like several multi-pronged connections between Diabetes and metabolic syndrome, and the gut that all starts with maybe multiple courses of antibiotics. They actually did a study where they found that feeding people more fiber-rich foods actually reduced their blood glucose and hemoglobin A1C. And it was through a mechanism of improving that butyrate secrete production in the gut. Because the bacteria in the gut, the healthy bacteria feed off of the fibers, which are the indigestible starches, carbohydrates in food.

So we start with diet. Diet is key. So you've got to clean out your diet. And you want to make sure you're getting enough fiber because the majority of Americans are only getting ten to fifteen grams of fiber. But women should be at around 25 grams and above. Men should be at 35 grams and above in the fibers. Everyone's not getting enough fiber.

And as a contrast to that, just to put it into perspective, the Hadza of Tanzania, which is one of the last hunter-gather societies left on the planet. They have more diverse microbiome than we do. And just thinking of the palette of foods that are eaten in the West, they're diet consists of only five things. They eat animals that they catch, they eat honey. When I learned this I thought, “Are they eating honey like the way we think of it.”

No. They're eating the honeycomb with the larva in it. So they're getting the whole food. They eat berries which are very rich in fiber. They eat baobab fruit, which has a nut in the middle, which is high in healthy fats.
and high in protein. And then number one probably reason they've got such a diverse microbiome, aside from the fact that they don't wash their hands and they kind spread the germs amongst each other. Is they eat a lot of tubers.

And that's pretty much year-round. And tubers are super rich in fiber. So a child in the Hadza tribe might be eating 100 grams of fiber daily whereas we're eating ten grams. I mean that's a huge contrast. And they don't have autoimmune disease. They don't have Diabetes.

**Dr. Mowll:** In addition to what you eat, when you eat, and how you eat are also important points to consider. One strategy that has been used and studied successfully is called time-restricted feeding. Or intermittent fasting.

Fasting was used to treat Diabetes extensively by Dr. Elliot Joslin and Dr. Fredrick Allen. Two early Diabetes pioneers. Before the widespread use of insulin. Not only that. It's part of almost every great spiritual tradition and has been used medicinally for thousands of years. In one recent study the authors concluded that, “Time-restricted feeding stabilized and reversed the progression of metabolic disease in mice with pre-existing obesity and Type II Diabetes.”

Another study showed that early time-restricted feeding increased insulin sensitivity, improved pancreatic function, lowered blood pressure, and decreased appetite. Most people who incorporate intermittent fasting or time-restricted feeding will use an eating window of 12:00 to 6:00 or so. This allows the body to fast for 16 to 18 hours. Which can help increase fat burning, weight loss, insulin sensitivity, and blood sugar control.

In addition to when you eat, combining foods properly and eating your food in a certain order may be helpful as well. Especially when eating carbohydrate-rich foods. It’s important to buffer your carbs with fat, fiber, and protein.

A study published in *Diabetes Care* found that eating protein and vegetables first, then eating the carbs, such as bread, reduced both the post-meal glucose and the insulin response.

The last area I'd like to discuss is micronutrient density of food. Certain foods like green vegetables contain few calories but many micronutrients. Such as vitamins and minerals. This is called high nutrient density. In addition to green vegetables, other foods such as nuts, seeds, and animal proteins, like meat and eggs, have the highest nutrient density.

Regardless if you decide to eat animal protein, follow a vegetarian,
vegan, or ethnic diet, use a Paleo, or Mediterranean approach, or just eat real food – it’s essential to restrict your carbohydrate intake if you want to control your blood sugar. This is the first and most often factor to achieving and maintaining good blood sugar control and preventing Diabetes complications.

Let’s make a commitment today to stop making excuses for eating carbs and sugar and be empowered to make a new decision, a decision to put our health above our cravings, to be stronger than our desires and to sacrifice the five minutes of pleasure that we get from eating something we’re craving for the lifetime of good health and vitality that comes with better blood sugar control.

In Module 3, I’ll be discussing a game plan to help you plan, prepare, shop, and cook for optimal blood sugar health, including how to overcome potential obstacles and pitfalls.

This is Dr. Brian Mowll, the Diabetes Coach, and I’ll see you back on the next video on Module 3 on the Diabetes Essentials program.
Dr. Mowll: Hello and welcome to module three of Diabetes Essentials, your diabetes game plan: planning, preparing, shopping and cooking for blood sugar success. If you fail to plan, you plan to fail. You've probably heard that phrase before. When dealing with diabetes and blood sugar problems especially in the long-term, this couldn't be more true.

In module three of the Diabetes Essentials program, I want to share with you the secrets of my most successful clients. The ones who have not only achieved optimal blood sugar control, but have been able to maintain it over many years avoiding the stress and anxiety that often accompanies diabetes and preventing the health complications as well.

This is Doctor Brian Mowll, the diabetes coach, certified and master license diabetes educator, an IFM certified, functional medicine practitioner. And in this module, I'll be discussing the most effective way to set and reach goals, how to find and use your core motivation, and the steps necessary to properly plan and prepare your meals, your exercise schedule, your shopping experience, and home environment to master your blood sugar. We’ll also get into how to eat while away from home; at restaurants, on vacation, during holidays and while travelling, to make sure you continue your progress instead of sabotaging your health.

Razi: When we look at how diseases like diabetes are so related to
lifestyle or maybe better said, how we live our lives. Because lifestyle has been like the word like Xerox or something, it’s a word that nobody thinks about, what lifestyle means. And it really means how we live, our relationships with ourselves and with each other. And I feel like if we return to a place of love, meaning not always pampering ourselves or making excuses for ourselves because we don't want to do something hard or because we deserve something, but loving ourselves in the way that we want to take care of our most prized possession which is our bodies that house our mind, house our spirit.

Our bodies are how we love the people around us, how we take care of the people around us. And diseases like diabetes are a perfect example of how we're not loving ourselves well. We can get stuck in shame and then we feel bad and so we keep making bad decisions. But what shame is really meant to do is knock on the day saying, “Hey, this doesn't feel good. Let's please pay attention.” I mean, one of the things I love about naturopathic medicine is that it really says that the disease is really part of the cure.

So when you have like your blood sugar changing or you’re having pain, or you’re not healing well, like wounds aren't healing, that is your body attempting to deal with what you’re doing to it. It’s like constantly loving you. And so when you build up like plaque in your artery, it's trying to repair damage that you're doing. That’s how much your body loves you.

And so, instead of looking at these symptoms as something to be afraid of, we should look at the gift that they're giving us and saying like, “Wow, my body loves me so much and it's working so hard. What I can I do to make it easier for my body to keep my blood flowing, keep my heart pumping, keep my blood sugar where it needs to be?”

I think about somebody that has a really neat car. They're going to keep it garaged, keep it covered, put the best fuel, the best oil in it; just really pamper that car. I mean, I have neighbors that do that. But we don't treat our bodies that well. For me, what works the most is to really get out of my head and just my thinking self and get more into my body.

One of my favorite people is the late Candace Pert. She was a researcher that discovered the opiate receptor. And so when she discovered the opiate receptor, she realized well, we have a receptor in our body that can take in these opiates then since we're born with these receptors we must have an endogenous or self-made manufacturing for these hormones and neurotransmitters that make us feel really good.

So then she further discovered that these are in our whole body, not just in our brain. So she says, “Your body is your subconscious mind.” And that really struck me because we really do think, with not just our brains but our whole body. So the best way to start loving yourself better, is to
really be mindful of how your body feels.

There is a term in science called interoception. And interoception is like a sense we have like sight, smell, taste, touch, but it's a way to feel or sense our internal body systems. An example of that, there's a term called mittelschmerz. It's kind of a German word and it means middle pain but it's a term used for when women can feel themselves ovulate. All women can do that, we've kind of lost that over time.

But it was kind of an old fashion way when women didn't have ovulation ways to measure that so they'd feel the mittelschmerz. So I've really in the past few years been really tuning in on how to increase my interceptive sensitivity. And so, I try to really, wherever I am, remember to take a moment and notice things like right now I feel the air conditioning come to the side of my body so I feel little cooler here. And I feel like the comfort of the pillows behind me and I feel the ground kind of holding me up as I'm sitting in my chair.

Like when I'm cooking a meal I listen to the sound of slicing the onions and I look at the brightness of the colors. And I try to really focus in on my senses. And when you really focus in on your five senses it helps you develop your sixth sense and then you listen to yourself. So when everything that you do or say or people that are around you, you know if it's something you should be engaging in or not.

And when you have a better sense of that interoception, you also have a better gauge of how you body feels, while or after you're doing something. So if you're eating something that you think is fun and you're really enjoying it, but you really get in touch with feeling your body, you'll notice that you feel bloated, or your stomach hurts, or you get a headache, or your thinking's a little foggy.

And you start to, not really desire that anymore because the feeling good in your body and the feeling clear and the kind of stronger intuition that you have trumps the taste of those donuts. And so it's by really engaging your senses and getting to learn to listen to your body, it helps you make the right decision for you which usually is a decision that's loving yourself. And that's the best practice to start with.

Dr. Mowll: Let's start at the end. Success coaches talk about beginning with the end in mind. In other words, it's important to know what you want and have a clear picture of the outcome before you create the plan and the steps to get there. So what is the end result that you want? How do you want your health to look? How do you want to feel? What is the emotion or feeling that you're really after? What does being healthy really mean to you? Take out a piece of paper and write down the answers to these questions because everything else we do will depend on those answers.
Then ask yourself this, why do you want to be healthy? Why do you want have better blood sugar numbers? Why do you want to lose weight or gain more energy? Why do you want to live longer or feel better? What does being healthy, having better blood sugar, or taking less medication do for you? Why are these important? What emotion will you feel when your blood sugar is normal and in control? When you’re able to reduce or avoid medications or insulin.

Again, the answer to these questions, your answers to these questions will determine your next steps. So take your time and do this exercise. Once you've thought this through and found your answers, you understand what motivates you.

Melissa: We had one client and the biggest thing for him, he thought he was going to die. He's about 324 pounds and his thing was, I just want to see my kids and diabetes. And it was really tying into his why? And seeing that he had already given up mentally without realizing it. And he wrote his obituary from that belief system and it was so awakening to him that it changed everything. And his why became really strong and he saw that your why for why you do this, if that's not strong and you don’t really want it, and you don’t actually see the impact of how it's hurting you.

I hate to say that so often I feel like we have to be brought to our knees to really make some of those changes, not everybody luckily, but some. And I'm such an advocate for saying, don't wait till it gets to that place and dig into that why for you. What would it mean? Would you really want to have that end tomorrow for you where you are? And allowing that to fuel the fire to make the changes that are needed to live a really vibrant and beautiful life.

Dr. Mowll: This is called your core motivation or sometimes called your big why. You want to come back to this over and over again, anytime you feel stuck, overwhelmed, confused or lack willpower. Anchoring back to your core motivation will help you overcome those moments of weakness and give you the strength to persist until you reach your goals.

Dr. Murray: When you talk to the patients and find out when things really started going downhill, it's amazing how many times that they can pinpoint when things changed for them. Sometimes it's a traumatic event; it's a stressor that kind of was the last straw on that camel's back. And one of the values of naturopathic medicine or good medicine, is we treat the whole person.

So we want to approach this condition, it's a multifactorial, multifaceted. So the more bases that you cover, the more likely the patient's going to have a great outcome. And I really know for an absolute fact in most patients, we can get them off their medications or significantly reduce
them at the very least, but in most cases get them off.

I think back at people's lives that have been changed by getting control. And they need, many times, an anchor or a lever to get them to do the necessary changes. I remember once I was giving a lecture in Houston, Texas and it was on type 2 diabetes, how to prevent and treat type 2 diabetes. And this gentleman came up, he was first to ask me a question. And this guy was big. He was about 6'3 and he's probably 280.

And he was almost in a panic. He said he'd just been diagnosed and his fasting blood sugar level was like 600. His A1C was like 15.8. He was in bad shape and he just started on some medications and they really weren't working well for him. And he was really scared because he had two young children. This guy was in his 40s and he was just in a panic. And he said, "Will your program work?" I said, "Absolutely." I said, "As long as you're committed and you comply and you take steps." And within three months he was totally cheered.

He went from 280 down to 210. The physical transformation reflected, improved physiology inside him, his inside changed. And one of the things that people don't realize is how bad diabetes feels. When your blood sugar levels aren't being controlled properly you have more aches and pains, your brain doesn't work as well, you're more depressed, you don't sleep as well. You're not functioning anywhere near 100%.

This guy changed his life and he felt better because of that. He's one of my favorite memories of how this program can work or how changing your life can get your blood sugar levels under control and that will really change your life. Who knows where this guy would have been if he would have gone the conventional route? Because we know the conventional route even though it addresses the numbers, it does not change the long-term outcome of the disease at all that much.

**Dr. Mowll:** Now that you know what's driving your desire for change, let's talk about setting some goals. With my clients, I like to set short and long-term goals. Long-term goals should still be realistic and attainable, but may take six months, a year or longer to achieve. These are sometimes called your Big Hairy Audacious Goals. They're the ones that almost scare you a little bit.

It's important to put these on paper. Write down at least five, up to 10 even; big goals. How do you want to look and feel? What numbers do you want to see on the scale, the glucometer and the lab report? What do you want to happen with your condition and medication use? And what do you want to be different about your health?

**Melissa:** What I truly believe is that, everyone's body is different. Everyone's needs are different. Everyone's lifestyle is different. And
everyone’s actual makeup on our DNA, on a cellular level and based off of our childhood and our different needs and relationships with food again play a big role in our choices and the needs that we have within our bodies.

And so, when it comes to actually making those choices, I’m such an advocate for being connected to what you body needs and that is always giving you the messages and telling you if we are actually taking the time to listen. But all too often the choices that we’re making are based off of our minds and not our bodies. And our minds are set up to keep us safe, so our minds only know what we’ve taught them.

And if you’ve taught your mind gaining weight to lose weight, the whole dieting cycle and if you’ve taught it we eat in restriction. So we try to eat healthy, but then we end up rebelling against ourselves or overeating. Or we’re good all day and then we go into these, these then create habits based off of beliefs in our system.

And that ends up dictating a lot which is what I see so often where people go, “I’m trying to make good choices, but then I get stressed out and this happens.” And then we end up choosing again based off of our minds and not our bodies because our bodies’ response system to stress isn’t, let me go eat so I kind of numb out and then don’t do anything. What I am advocate for is one; let’s actually get clear on what feels good for you. So let’s start to identify your lifestyle, let’s start to look at your needs, what’s going on in your life.

I always say, “Where there’s lack, you’ll fill the gaps with food.” So my entire approach to the way that we eat is, the way that we eat I believe dictates the way we do many things in life. And I feel that, our relationship with food is very synonymous with our relationships with money and our habits and spending.

And so when I work with clients, we look at their life as a pie. And I say, “Okay, when we’re looking at your life as a pie, we’ve got spirituality, we’ve got sex and intimacy, we’ve got money, career, relationships, and your body and health.” And we’re looking at those and going, “Where of this is the pie full? And where are we missing?” We start to connect the dots. And then I say, “Because the way we eat, you’re not eating the way you’re eating because you’re so happy with all these areas in your life.”

We’re filling gaps and these have become coping mechanisms, ways of dealing with life that support us that we learned at earlier times in life, of I actually didn’t have the skill set to be able to deal with the loss of this family member so instead I ended up eating. So every time I get triggered with that, this is my response.

And when I get stressed out, at 4 o’clock in the afternoon or at night
when all the kids go to bed, my way of relaxing and giving back to me is food. So there's these different things in place.

So when we start to identify those gaps, we're looking at a whole approach to life. And really because I believe is medicine and really looking at how can we eat to facilitate and nourish my life, my beliefs and my desires and my goals for my health and my body. So then from there, I will ask my clients, I'll say, “So in what ways are you getting in the way of these goals?” So now that we've mapped out your goals, now that we've identified your gaps, what ways do you get in the way?

They all go, “I don't know,” and then it's, I'm not getting enough sleep. I'm stressed out. There's so much on my plate. Everything is expected of me. I'm at the bottom of my list, I'm not taking time for me. I'm not prepping food. I don't have healthy things on hand, I'm just grabbing things. I'm eating whatever my kids have. I'm just grabbing stuff. And then we start to see, here are actually just action steps. We haven't even gotten to the mental game.

Now we're just looking at what are practical things that we can just make a list of and then make the opposite? I’m eating my kids’ food so what would you support you? I'm going to prep and have healthy things on hand and get clear with myself that my kid's food is my kid's food. What's my mommy or daddy's foods, right? So then we've got practical things. And then after we get into some practical things because we all need those tangibles that we could do, then I look at where did we create these coping mechanisms with food? Because there's always a root cause.

**Dr. Mowll:** The next step is to construct your short term goals and to create an action plan to help you reach them. When setting short term goals, we want to use a formula called SMART, S-M-A-R-T. That means that your short term goals should be specific, measurable, attainable, relevant and time based. If they don't meet that criteria, then you need to alter the goal to make it more outcome oriented.

Specific means that the goal should be written simply and you should clearly define what you're going to do. Ask yourself, what will this goal accomplish? How and why will I accomplish it? Measurable means that your goals should be specific, measurable, attainable, relevant and time based. If they don't meet that criteria, then you need to alter the goal to make it more outcome oriented.

Attainable means that the goal should be achievable. That they should stretch you slightly so you feel challenged, but defined well enough so that you can achieve them. Ask yourself, is this possible? Have others done it successfully? Do I have the necessary knowledge, skills abilities and resources to accomplish this goal? Relevant means that the goal
should be meaningful to you. They should be reasonable, realistic, and worthwhile and should be congruent with your core motivation. Is this the right time? Does it match your core motivation? Is it applicable to your life? And is it the right goal for you?

Lastly, time based means that your goal should be linked to a time frame that creates a practical sense of urgency or results in tension between your current reality and where you want to be. Ask yourself, when can I reach this goal? What is a realistic completion date that will create a sense of urgency to push me towards my goal?

Let's focus on the first 90 days. In 90 days what specific and measurable changes, do you want to see in your health? I encourage you to write between three and five goals that you can focus on over the next 90 days. Make sure each of these goals fits the SMART criteria.

Next, think about what potential obstacles may stand in your way. Write these obstacles down and solve the problem in advance. Think about strategies that you can use to overcome these obstacles so that you can continue to move forward towards your goals. Let's take an example, say that I want to lose 20 pounds in the next 90 days. First, is this goal SMART? Is it specific, measurable, attainable, relevant and time based? Now, some may argue that it's not attainable, but based on my clients' experience with the right plan it certainly is, you can achieve that.

Next, what might get in my way of loosing that 20 pounds in the next 90 days? I could fall off the wagon with my nutrition plan due to travelling or holidays or I could get busy and forget to exercise regularly. So how could I then solve these potential problems? If I get off track with my nutrition plan, I will commit to get right back on at the very next meal. I call this the next meal rule.

And to make sure that I don't forget to exercise, I can schedule my exercise in advance including specific dates and times. Now, I have the framework for a good plan. From here I have my clients set 30 day action oriented goals. These should also be SMART goals but they're more focused on an action and less on an outcome. 90 day goals outcome oriented, 30 day goals action oriented. Here's an example of what a 30 day goal looks like.

Let's continue with my 90 day goal of losing 20 pounds. Ask yourself or work with your diabetes coach to determine what you need to do to get there. For example, you might want to limit your daily carbohydrate intake to 50 or 75 grams per day, or your calories to say 1500 to 1800 per day. You may choose to eat eight servings of fibrous vegetables and leafy greens per day. Maybe you want to set a goal to do cardiovascular exercise, five days per week for 30 minutes a day.
These are just examples. Notice though that these goals are action oriented and you can track and measure whether or not you completed them. Once you reach 30 days, look back to see how well you did. I usually like to see my clients perform their action goals at least 80% of the time. Assess your progress, analyze your results and then set new 30 day goals.

Once you’ve found your core motivation, envision your future with long-term goals and set your actionable SMART short term goals. You’re ready to clean house and set up your life for blood sugar success. One of the most important steps towards good dietary and blood sugar management that many people ignore, is creating a healthy environment. You need to protect yourself by creating a safe environment at home, work and in social situations to encourage your success.

**Stephen:** If laundry detergent can make my kids sick, what else is in the house, what’s under the kitchen sink? Then I became I guess like a full-blown eco conspiracy theorist, on the back of every label and researching. So for years I would literally stand there at the grocery store with this 14 letter chemical, what is that?

And then years went by and I met this amazing formulator who was selling laundry soap at a farmers’ market and she says, “Hey, I don’t know what to do with this company.” And I’m like, “I know how to build companies, you know how to make stuff, let’s go.” And so MyGreenFills came out of a pursuit to really help people detoxify their homes. And we started and really focused mostly on laundry because we believe that laundry is the most toxic of all the consumer products.

People that manufacture food, ingestibles, nutritional supplements, anything that has to do with food, USDA, FDA governs that. So if you’re manufacturing food, USDA if they come in they want to make sure your place is clean and labels and all of that kind of stuff. And they verify if stuff that you’re putting in people is true or not.

There are some loopholes in even labeling for food, but in the nine years that we’ve been manufacturing cleaning chemicals we’ve never had one agency anybody ever walk through the doors and say, “Is what you’re saying on the label true?” So it’s really the fox is guarding the hen house because when you as a consumer have to trust all these chemical companies what they’re saying on a label, true.

But there’s this thing called the fragrance loophole, I’m sure if you’ve ever heard about it or not. But here’s the deal, if I as a manufacturer or anyone else, any of these other chemical manufacturers, whether it’s laundry, window cleaners, whatever, if under one percent of the final product has any ingredient in it, I do not have to list on a label.
So when you see on the back of a label, you see parfum, fragrance, perfumes, you can literally loop in a smattering of chemicals under this one percent thing. And under trade secret laws say its fragrance, so even documented carcinogens, endocrine disruptors, hormone mimicry, these synthesized chemicals don't even have to be listed on a label and it's legal.

So we’re being bombarded with fragrance. Laundry, UV brighteners, you see a laundry jug and it's with blue it's bright blue or green. And the reason is so that it literally leaves a blue or green film on your clothes so that under ultraviolet light artificial light, it gives a perception of brightness. So it tricks our eyes into a new spectrum of light to trick us to think my clothes are cleaner and brighter.

I mean, it's really a messed up industry and we're taking a stand against it. No one knows when you add two three things, you have a new chemical compound. So really we’re creating these new chemical compounds, you switch products, so you go from product to product. That one product left this on your clothes so now you’re combing all in your washing machine.

And now you're wiping it on your wet skin. It's frightening and it's because of guys like you that people are changing their mind because we're educating that there's another way and you can’t do this stuff anymore. Remember like high school, you did your high school experiment, you took baking soda and vinegar and you made your volcano?

Well, you just made sodium acetate, you just made a whole new chemical compound, there's a reaction that takes place. Well, think about that as so simple well, that happens every single day. It happens with the window cleaner, the dish washer, the laundry, the surface, all of these things when combined together, you don't know what you're creating.

You don't know there were these chemical reactions and we’re breathing it in, we're putting it on our skin, in a dishwasher. You’re leaving that film on your glasses on your plates. When you clean something in your sink, you use hot water or cold water? You use hot. Hot cleans better or hot has a lower surface tension.

When you have a hot cup of coffee in the morning and your cup was cleaned with a toxic dishwashing detergent, you now have a film that's squeaky clean. That's because there's chemicals left on the cup. So now you’re taking a hot acidic liquid, you’re putting it in a cup that has a chemical film, what is it doing? Drinking it. I mean, it's everywhere. We’re breathing it, we’re ingesting it, we’re wearing it, it's everywhere. So environmental toxicity is literally everywhere.
Dr. Mowll: Clean out your pantry. Get rid of any food that may provide unnecessary temptation during stressful or difficult moments. This can be hard to do but it will save you a lot more trouble down the road. Take out the cookies, snacks, juices, sodas, bread, pasta, high carb soups, and anything that might tempt you at mealtime or late at night. Go shopping and replace processed refined foods with fresh healthy alternatives.

Get rid of the snacks and sweets and replace them with real food ingredients you need to prepare you low carb healthy meals. At work, make sure that you avoid areas where there might be landmines which can sabotage your willpower. If you have a break room or a conference room where people put out donuts, bagels, sandwiches or cookies, stay away from these areas. Don't torture yourself.

It's also important to think through your social engagements. If you have friends that like to get together and share foods that are sabotaging your health, make new plans. Your health is too important to put yourself in harm's way or create unnecessary temptation. Next, I recommend creating a weekly menu or meal plan. I like to do this on Saturday morning then shop on Sunday, do whatever works for you.

Look through healthy recipe books on low carb websites or in magazines that feature low carb meals for different ideas. Write down what you plan on eating for each meal of the day for next week. This may sound like a lot of work, but it'll save you time and again save you from being trapped in a situation where you're hungry, tired and don't know what to eat. That is a recipe for disaster.

From your menu create a shopping list and then it's time to hit the grocery store. When going grocery shopping for the week, there are some tips and strategies that can help you to avoid traps and make the best decisions. First, as I just mentioned, bring a list. Don't wonder aimlessly from aisle to aisle on the grocery store, with no plan of attack.

In fact, I recommend mapping out your grocery store so you know exactly where to go in the right order to get the foods you need and more importantly nothing else. Start in the perimeter of the store, on the outside of the store, in the produce area and work your way around the outside. We tend to buy more at the beginning of our shopping trip so fill up on vegetables and then get some fruit. Then we'll work our way around to the eggs, meat, dairy, and just skip the bakery section.

After you've circled the perimeter of the store, you can selectively dive-bomb the center of the grocery store to get what you need. Again, it's best to have a list and a preplanned strategy to get only what you need. Food manufacturers spend lots of time and money researching the colors, pictures and descriptions they use in the packing of the food to manipulate your desires. They pay for product placement to get in front
of your face at eye level so that you'll their products and pick them up. Don't get baited into this experience. Protect yourself by planning and shopping in a way that helps you avoid these tricks.

**JJ:** Sugar is our number one recreational drug of choice. I love that line, its Doctor Mark Hyman's. Credit where credit is due. And I heard that I'm like, “That's good.” But so I think we have to go all right, knowing that how are we going to handle this? And you mentioned sugar and carbs and of course as we know all carbohydrates except for fiber turn into sugar. We just want to look and go, are we mainlining it or are we making it slowly from the foods we eat? Which is the super key thing that we want to do. The other challenge is, we do have those genetic sweet tooth, sweet taster genes.

So genetically there are people who have more of a sweet tooth. I'm adopted. My adopted mom is a massive sweet tooth person. My nickname was Poppy. I was raised on Pop-Tarts, raised on those sweet rolls, all these stuff. I actually don't have a sweet tooth, but it can be trained; exposure equals preference. Which is the problem with a lot of these, I mean there're so many problems with artificial sweeteners but one of them is training us to want more and more sweet.

And so when I looked at all of this, the biggest question I got asked after I wrote The Virgin Diet was about sugar. And what I noticed was people were either confused, they were like, but it's all natural. It's honey. I'm like, “But what's honey doing once you eat it? Your body isn't going, no worries it's honey. Don't worry. Don't raise your blood sugar, don't raise your insulin, its honey.”

That doesn't happen as we know. Or they were going, “But there's no calories it's blender its fine,” or they were just controlled. They were like, “I know I should not be having this, but I can't do anything about it.” So I was determined to fix that. And so what I did is, I took 700 people who basically said, “I'm a sugar addict, I cannot quit.” So I did not make this easy on myself, but I figured if I couldn't prove this to work then there was no point in going further.

And I went and I looked at all these programs that promised that they would help you get off sugar and I started to read the negative reviews on Amazon, not because I wanted to be mean, I wanted to see what wasn't working. And what I saw wasn't working is this, if you are letting sugar sneak into your diet and if you're not aware you probably are because it sneaks into the silliest places as you know. Like marinara sauce can have more sugar than Oreo cookies.

And so if you're not being super mindful, if you're not totally aware, you probably have a lot of sugar sneaking into your diet. If you do and you got any other cofactors like poor sleep or stress, lack of exercise, you
probably have some problems with blood sugar and problems with insulin resistance. So when you have those things, it makes your body really struggle to burn fat for fuel and stick you in being a sugar burner.

Well, if you’re a sugar burner which means you’re always relying on that next hit of carbs to be able to keep your energy up and you pull all that out, you’re going to crash and you’re going to go rushing for the soda or the cookies or the whatever.

So the first thing we have to do is create some metabolic flexibility like getting you shifting from being a sugar burner to a fat burner so that you have some control otherwise you’re setting someone up to fail. The other thing we have to do is retrain your taste buds to appreciate natural sweetness like eating a blueberry and going, “That’s sweet.” I mean my mother raised me pretty sugar on strawberries, I’m like, “We don’t eat sugar on strawberries they’re already naturally sweet.

So the way I have people start this is first, to eat by what I call the trifecta. So good fats, optimal protein, not loads of protein, but an optimal amount of protein and then lots of fiber for what I call low sugar impact carbs. So those will be things like lentils, wild rice, squash, black beans. Lots of non-starchy vegetables but things that are higher in fiber and low in what I would call a big sugar impact. They don’t make sugar quickly, they don’t turn into sugar quickly.

So that’s the first step because it’s going to help stabilize blood sugar, but the next thing is how can we retrain your taste buds? So one of the hacks I have is to take some lemon juice which also works really because it helps lower the blood sugar response to a meal. So a couple of tablespoons of lemon juice, a little bit of what I would call an approved sweetener like Monk fruit or Stevia or Allulose but not much, like the tiniest bit because you don’t want it to be sweet, you want it to be sour. Some glutamine that kind of tricks you into thinking that you’ve had something to eat and then some fiber like chia. And you drink that, it’s going to make you less hungry for your meal, better blood sugar response to a meal and the sour helps take the sweet tooth away.

While you are training your taste buds to start to appreciate savory and spicy and salty rather than everything is always sweet, which really kind of drowns out. It’s like being at a rock concert and then coming out and trying to hear, it’s the same with all that sweet. It just kind of kills your taste buds. They don’t appreciate anything anymore.

**Dr. Mowll:** Many people ask me how to handle vacations, holidays, restaurants, special occasions and travelling. When you have less control over your food choices, how do you avoid a catastrophe? Again, planning is the key. If you’re going out to a restaurant for a meal try to get the
menu ahead of time by going to their website or asking them to fax you a copy. Then decide what to order before you go at restaurants or holiday meals, avoid the pre-meal bread and post meal dessert.

Focus on the foods that you can eat not all the other options that you should avoid. Fill up on vegetables, healthy fats and good quality proteins and just ignore the rest. In some cases like with weddings or other special occasions it might make sense to actually eat before you go. That way instead of being hungry and losing your strength of will, you can go to the event or occasion confident that you don’t need to eat, but you can if there are some good options for you to choose.

Remember, the purpose of the wedding, holiday gathering, special event or social occasion is not to eat. The purpose is to celebrate life, to socialize, and enjoy the other people there. Instead of thinking about food and getting obsessed, go to the event with a spirit of gratitude and try to bring value and blessing to the people that you share time with.

Make it more about people and less about food. Lastly, while travelling or on vacation preparing is equally as important. Bring healthy options like some raw nuts or healthy jerky with you in your bag. On vacation, focus on relaxing and exploring, rather than eating and indulging. When you do eat, stay in balance and make the best choices that you possibly can given your options. Then consider going for a walk or getting some other exercise to make up for any small deviations in your diet.

JJ: I think coffee is a health food, I think you do too, right? Yes, but again it’s like you get people complaining about beef and it’s not good for you. I go, “Well, if its factory beef that’s a very different thing, grass fed and finishing pasture beef.” Same thing when you’re looking coffee. Like coffee that is organic and mycotoxin free like our buddy Dave Asprey’s Bulletproof, that’s fantastic. It is absolutely great and has been shown to be great for diabetes.

So that’s a good one. It’s really what you put into these things that creates the problem. So put in some healthy fats you’re good, put in some of that crappy flavored creamer or trying to make it non-fat skimmed milk skinny lattes, you’re fooling yourself.

So coffee, sparkling water. Shout out to Hint water. I think that’s a great one to get. That’s my girlfriend; you’ve met Kara. Iced green tea. There’s a great drink called Suja, I am absolutely addicted to this. It’s this lemon cayenne drink with a little bit of Stevia. And barely any calories; it’s mainly lemon juice, spring water, a little bit of cayenne so good for your metabolism too and delicious. So that’s one of my favorite things to do.

And if you’re absolutely one of those people and you’re trying to transition off of soda, step one I tell you to go to something like a Zevia,
you know, a Stevia sweetened soda. And then start going to sparkling water with some of those Zevia, the little Stevia drops of something and then keep tapering on over.

But I like to do what I call a lateral shift or a swap, rather than going, “Okay, you've been drinking a super big gulp every day, just stop it and have water.” I'm not doing that, so let's make it realistic. And then as far as alcohol goes, I just stick with Dry Farm Wines, our buddies and the occasional tequila and that’s it. It's just in what you put in it. Don't put all that garbage in it, have a little bit of lime.

And I mean, I say this because this is how you can actually do this long-term because if you’re telling people, “No, you’re never going to have any of those things again.” They're like, “Yeah, I'm out.” But if you say, “There's places for all of these things, you just need to know the right ones to choose and you'll be fine,” they're like, “I can do this.”

**Dr. Mowll:** You don’t need to be perfect. It’s important to be gentle on yourself and be okay doing the best you can in the moment. That said, certain foods like processed refined sugars and carbohydrates and sweets can be highly addictive. So be careful with these. Everything is not okay in moderation. There are some things you should just never eat especially if they trigger a food addiction and put you in a difficult or tenuous situation.

It’s important to change your mind around these foods and to see them for what they really are, instead of using them as treats or rewards. I’d like to encourage you today, to choose foods that contribute to your health and healing process. Foods and activities that bring you closer to reaching your goals and helping you make your big why, your core motivation a reality.

**Christa:** We have to learn to respond to life instead of react to eat, so you find something whatever is your pressure valve release. For me personally it's yoga. But yoga is studied that it's clinically proven that by doing the certain stretches, you’re actually getting the cerebral spinal fluid to nourish the nerves.

And so by doing forward bends things like that you can start off in sympathetic dominance, you can take a gentle yoga class and end in parasympathetic dominance which is where you want to be. And foam rolling is also amazing for this. I don't know if you've tried it, but full body foam rolling but especially in the hips and the psoas especially because we sit a lot. But they say, that's the junk drawers of our emotional storage and it's like, hey, life can be a lot and we still have to operate our responsibilities. And if we can't process it, we store it within the body.

And so you’ve got to find a way to release these negative emotions so
that when future stressors happen, you are responding in the present moment not at this knee-jerk trigger from the past. So that’s so key because you can do all the healing work in the world with your food or with supplements, but then the next time a major life stressor comes or even a little stressor, you’re going to go back into that. And so this is where sometimes the clinical can even be a Band-Aid unless you do the work that you need to do to remain grounded in the eye of the storm.

Dr. Mowll: In the next module of the Diabetes Essentials program, module four, I’ll be talking all about physical activity and sharing the strategies that I use with my clients to get better blood sugars, more energy, improve sleep and maximum health. This is Doctor Brian Mowll, the diabetes coach. And I’ll see you back next time for module four.
Module 4
Move Your Body: Using Physical Activity Strategies to Optimize Blood Sugar

**Dr. Mowll:** Diabetes and pre-diabetes is a problem of too much sugar in the blood. Sure, there’s much more to it than that, but that’s what characterizes the disease and the problem: too much sugar in the blood. So how do we get the sugar out of the blood? Well, there are medications and botanical therapies, which we’ll discuss in a future module that can help you take some of that sugar out of your blood and store it in your fat cells.

But what if there was a way to increase the amount of sugar that we burn, so that we could actually use it instead of storing? Wouldn’t it be great if we can not only burn that extra sugar in the blood, but burn some of the fat stored in the fat cells and around the organs so that we could lose weight and get healthier at the same time? Well, of course, there is a way to do just that. And the best news is that it’s natural, easy, and completely free. It’s called exercise or physical activity.

I’m Dr. Brian Mowll, the diabetes coach, certified and master licensed diabetes educator, and IFM certified functional medicine practitioner. And that’s exactly what I’ll be teaching you in Module 4 of the Diabetes Essentials program.

**Dr. Kushner:** So exercise is a really big deal. And as people learn the value of exercise in type one diabetes, as they exercise regularly, they’ll see that their blood sugar smooth out. And that’s from a really unique
pathway. There's a insulin independent glucose uptake in skeletal muscle. And so after exercise, many people with type one diabetes will realize that their blood sugar has go low. And what's happening is you're actually tricking your skeletal muscle into sucking up glucose. So it's like a sponge.

And if you can build up aerobic exercise into your life on a daily basis, and oftentimes you can reduce the total amount of insulin you require. And also reduce the amount of bouncing around the influx to the point where the marathon runners require far less insulin than you'd imagine and have very smooth blood sugars.

So exercise is a big thing, but also stress. And so if you're excited or stressed, or under a lot of pressure, or even if you're exercising like, for instance, a very intense sport like basketball, you may see your blood sugar's go up early on from that adrenaline. And so finding ways to anticipate those rises is a good idea. And also finding ways to calm your mind and be able to try to minimize the amount of daily stress.

Sleep is also a big deal. Sleep is enormous. And people with type one diabetes often described that their blood sugars are kind of zany, and out of whack on the days that they don't get a lot of sleep. So that's not easy to do, but finding ways to track your sleep and to make sure that you've turned on devices early in the night and are able to give yourself time to rest. It's a big deal.

**Dr. Mowll:** There are five different types of exercise. And each of them has different benefits, and mechanisms, which can help you achieve optimal blood sugar levels and control. In Module 4, we'll talk about all five of these types of exercise, as well as how each of them affects blood sugar regulation. I'll discuss strategies to incorporate exercise, and share safety considerations to help you have the best experience with your physical activity. Lastly, I'll teach you how to create a physical activity plan that works to help you optimize your health and master your blood sugar levels.

**Ari:** I'm personally of the opinion that if you have the right template of sort of optimal nutrition and lifestyle strategies, that can pretty much take I would say, 90 plus percent of people, 90 or 100% of the way to optimal health, optimal metabolic health, optimal energy levels, optimal blood sugar levels and body composition, you know, in just by doing those strategies, even without any sort of advanced testing, or customization of the protocol to that individual.

And then certainly there's a place for that if somebody is doing as lots and lots of these strategies in terms of the nutrition and lifestyle strategies, and they're still not getting all the way there in terms of their results, then you might want to go look for something, or if there's
some symptoms that are calling out to you as being a potential sign of something serious. By all means, do the test to figure out, hey, is there something more serious going on.

But I'm really of the opinion that the vast majority of people can get pretty much all the way to amazing energy levels and amazing body composition and blood sugar regulation by just having the right system of nutrition and lifestyle habits. So I'll give you an example. There was a recent study where they looked at risk of heart disease.

And they didn't measure biomarkers, they measured the simple act of how many pushups people can do. So can you do one push up, you know, as a starting point, can you do more than 10, 20, 30, 40. They found that the people who were able to do more than 40 push ups had something like a 95% lower risk of having a heart attack or stroke or cardiovascular event. In this window of time, I think it was 15 years or something as compared with the people who could do less than 10.

So I think that this kind of thing is a really underrated way of looking at, you know, sort of evaluating a person's health. I personally believe that that simple thing, like just looking at how many pushups someone can do, this one type of activity could be just as powerful or maybe even more powerful as any biomarker that you could possibly measure. I mean, it might even be more strongly correlated with low risk of heart attacks or cardiovascular events than something like their LDL measurements, or their total cholesterol, or any combination of cholesterol numbers, or their CRP, or any other biomarker that you could possibly measure.

So I'm very into that, like, let's measure the lifestyle habits, what do those look like? And that I think, can give you almost just as much insight into what's going on in a person's body and where they're at, as the biomarkers can. Certainly, if you have both, you get a great picture. But I think that the lifestyle habits can tell you about lot and can be used as a diagnostic if you -- just the same way you take a blood test, and you look at a person's result.

And you compare it to a template of what the optimal ranges are. I think you can do the same thing with nutrition and lifestyle habits. What are your habits? And what is the optimal template of habits look like? And then where are things off? And where can we correct them to be in the correct range?

And to some extent, I would even argue that it leads to more direct targeted interventions that are actually supported by lots of evidence. So for example, if you are just looking at biomarkers to take the conventional medical model, let's say they're looking at some measurements of cholesterol and LDL, and they see that they're off. So
let's alter the biomarker by using something like a statin drug.

Okay, so they think, the paradigm becomes focused on the biomarker. In this model that I'm presenting, focusing on the habits, the approach would be like, this person is clearly not eating very much greens, or berries, let's introduce greens and berries. So now you can compare, what is the evidence look like for the statin drug in terms of how that affects various disease risks and longevity? And what are the associations in terms of brain health and you know, all the different relevant mortality endpoints and disease endpoints. And then you can do the same with the intervention of increasing greens and berries.

Personally, I'm of the opinion that massively increasing a person's greens and berries intake is going to have way, way more positive effects than the statin drug approach on a much broader variety of different disease endpoints. So that's kind of my model. That's how I like to look at things.

**Dr. Mowll:** Let's start by looking at the five types of physical activity, and the benefits conveyed by each of these types. These include restorative exercises, stretching or movement therapy, slow fat burning, aerobic cardiovascular exercise, resistance training, and sprint training.

**Dr. Pompa:** When you force adaptation, you force a hormone optimization. What does that mean? Meaning that if you work out, what happens your body has to adapt to that stress. If you work out too much and don't rest, you don't adapt and you get weaker, not stronger. But when you do adapt, you get stronger. So your body adapts to that workout by optimizing certain hormones; your testosterone goes up, male or female doesn't matter, your cells become more hormones sensitive, all those things occur to adapt and you become better.

Cellular energy gets better, you get stronger muscles; all that from the adaptation. Dietary changes, something I call feast famine cycles, can emulate that same forced adaptation, and creates a hormone optimization where the cells get more sensitive to hormones, that's what you want. You want your cells to be able to hear the hormones, it goes beyond insulin.

As you know, most people with diabetes end up with thyroid conditions, and most people with thyroid end up with diabetes. I would argue there's a lot of -- they end up with estrogen problems, and I could keep going down the list. So the point is, you're not just resistant to insulin. You know, this resistance happening to other hormones and other chemical messengers that your body has to grade.

People don't die from diabetes. They die of the complicating factors around it. And then we don't talk about the life of the misery of degeneration that goes on, all the degenerative conditions that happen.
Here's the big problem. Your doctor you go to the doctor, the trained, so technically not their fault, “But, oh, we got your glucose looking better.”

So it's a high five and on your way out the door, and not really understanding that your cells are still in a state of hormone resistance. All we're doing is forcing the glucose into the cell, forcing it here or there and other cells pushing the glucose out. “Oh, we got out of the blood.” That looks great. But meanwhile, we haven't really dealt with a real problem.

**Dr. Mowll:** Restorative exercises are generally slow, focus movements, which help relieve stress and create balance in the body and mind. This category includes walking meditation, Tai Chi, and Qi Gong, certain types of yoga, as well like shiva yoga. The purpose of this type of physical activity is to increase connectedness, wholeness, and mindfulness. It uses gentle body movements to relax the body and mind and create healing.

A comprehensive review of literature published in 2011 show the both Tai Chi and Qi Gong practiced regularly, improved physical function, bone density, quality of life, mental function, and immune health. This type of activity can be done multiple times each week to reduce stress and create balance, peace and harmony in the mind and body.

The next type of physical activity is stretching or movement therapy. Here we're lengthening the muscles of the body and working on core strength and balance. This includes yoga, pilates, movement techniques like Alexander Technique, and somatics, certain types of physical therapy movements and general stretching as well. This type of activity can be done daily to enhance body function, agility, flexibility, balance, strength, and movement.

A clinical study on the effects of yoga on blood sugar, and people with type two diabetes found that yoga reduce blood sugar levels by almost 20 points. And the authors concluded, the results of the present study demonstrated that the yoga is effective in reducing the blood glucose levels in patients with type two diabetes.

As we age, people tend to become more fragile and lose their functional strength and balance. The CDC states that falls are the leading cause of injury and death and Americans over the age of 65. Dr. Grant Baldwin from the CDC says falls threaten older Americans independence and safety, and generate enormous economic and personal costs that affect everyone. People can reduce their risk of falls by focusing on functional movements, balance and building core strength with these types of exercises.

Now the next three types of exercise make up the levels of the Sweet
Life Fitness Pyramid, which is what I teach all of my private patients and clients. At the bottom of the pyramid is slow, fat burning aerobic cardiovascular exercise. This includes walking and jogging, biking, swimming, and working out on exercise machines like the elliptical or the recumbent bike.

In order to achieve the greatest benefits from this type of exercise, it's important to raise your heart rate into the moderate exercise fat burning zone. Typically during this type of exercise, you maintain your heart rate at about 60 to 80% of your estimated maximum heart rate. This is called your target heart rate. To calculate estimated maximum heart rate, exercise physiologist, Jason Karp recommends using the following formula; multiply your age by point 685, then subtract that number from 205.8.

For example, if you're 35 years old, your estimated max heart rate would be 182. When our muscles and cells are able to utilize oxygen for cellular respiration, it's called aerobic exercise. And we tend to oxidize or metabolize fat primarily. This type of exercise can be sustained for long periods of time with proper hydration and nutrition. There are numerous benefits for blood sugar health from doing this type of cardio.

**Dr. O'Bryan:** First and most important thing in detoxing, in my opinion, is that the highway is open to carry this crud out of your body. What does that mean? You have to drink enough water, you have to hydrate, and most people do not hydrate well enough. If you hydrate well enough, it's a half ounce per pound body weight. Minimum, half ounce per pound, you weigh 150, that's 75 ounces of water a day.

And what people usually say is, “Oh my god, I'll be peeing all day.” Well, that's the point. We want you to get a flush this stuff out. So first, you have to have the highway working, good transportation on Highway to escort these toxins out, then mobilizing the toxins onto the highway. How do you do that? Aerobic exercise, going for walks, getting your pulse up a little bit, but not too high.

The formula is 180 minus your age, plus or minus 5. And if you've been diagnosed with a disease, it's 180 minus 5. So it's 175 if you've been diagnosed with a disease of any type; 175 minus your age, plus or minus 5. If you've not been diagnosed with the disease, it's 180 minus your age, plus or minus five.

And that's the zone that you stay in for your exercise. And people who currently exercise but don't monitor, when they start monitoring what they see is, “Oh, my god, my pulse is 20 points higher than what this says. That can't be right. I can't have go that slow.” No, that's correct. Most of us are living off some type of stimulant in this crazy society today; is coffee, is sugar, is caffeine and other forms of cigarettes, or for
the healthy ones, it’s excessive exercise.

And they’re exercising in their anaerobic range, they’re pushing too hard. And it just pumps them up, pumps up so they make more stress hormones, so they feel better afterwards, they’re kind of pumped up. But the result is you burn out your adrenal glands. So you can’t exercise anaerobically above your pulse range, your ideal pulse range regularly.

Once in a while, it’s okay but not as a regular exercise, regular exercise has to be 180 minus your age plus or minus 5. Put a pulse monitor on them and say your pulse monitor is your coach. And there’s one rule to exercise; never argue with your coach. Has been really, because your pulse says, “You’re going too fast.” “Oh, that can’t be right, I need to go faster.” No, this is the exercise range that will make you healthier.

The exercise range that you’re used to is the one that’s making you sicker. In the short term you feel great when you’re doing x minute miles running or whatever it is you’re doing, CrossFit or whatever it is. But if you’re outside, if you’re in your anaerobic range, you’re causing degeneration, as opposed to regeneration.

**Dr. Mowll:** The American College of Sports Medicine and ADA, in a joint position statement said, “It’s now well established that participation in regular physical activity, improves blood glucose control, and can prevent or delay type two diabetes, along with positively affecting lipids, blood pressure, cardiovascular events, mortality and quality of life.”

**Dr. Menolascino:** So Dean Ornish, I worked with him when I was in high school. And he showed us that instead of having a cardiac bypass for blockage, you could do lifestyle medicine. They did a study in Minnesota looking at lifestyle medicine versus the top line medical diabetes medication, lifestyle medicine beat it out. So we know that proper exercise, looking at your nutrition, having some stress relief in your life, having some love and social support is lifestyle medicine that beats a cardiac bypass. Dean Ornish’s group has still done better now 35 years later. So we know that these programs work for reversal of diabetes, for reversal of heart disease.

And it’s really you putting it all together what’s your story? What’s unique about you? How do we get lifestyle medicine to work for you? And that’s what I think you do in your program so well, you personalize it. Some people don’t like to jog, some people don’t like to go to the gym. What do you like to do that can help you and help you develop this lifestyle plan where food is your medicine, kitchen is your pharmacy, lifestyle is your doctor.

**Dr. Mowll:** So what should your cardiovascular program look like? Cardio exercises have specific goals. And those are to increase your
breathing, get your heart beating faster, and work the major muscle groups. Some of the best cardio exercises are walking, which is great when you're just starting out. Biking, jogging, hiking, swimming and dancing. Remember, you'll want to start out slow and gradually increase the amount and intensity of your activity.

Again, achieving and maintaining the elevated heart rate is the basic goal of your program. You'll know you're in the right heart rate zone if you're moving your body at a good pace, but can still hold a conversation. If you're working out alone in your home gym or just try saying something out loud, perhaps the Pledge of Allegiance. That way you'll see if you can speak easily or not. If you can't, slow it down just a bit.

Now in general, there are five steps of a good cardio workout. And I recommend you do all of these five steps to maximum benefits and safety. Step one is to warm up for about five to 10 minutes, you want to slowly raise your heart rate to about 50% of what it will eventually get to. Step number two is to stretch.

Yes, you want to stretch at the beginning and at the end of your workout. Spend another five to 10 minutes to lightly stretch your major muscle groups to help you avoid injury. Step number three is your workout. Here you'll spend roughly 20 to 40 minutes exercising. Again, depending on your fitness level, your duration, of course may vary. Step number four is a cool down; spend about five to 10 minutes, allowing your heart rate to slowly decrease back to its normal resting heart rate level. And then Step five is to stretch. Again, remember to protect those major muscle groups.

The American Heart Association recommends to get at least 150 minutes per week of this type of physical activity, which can be divided into 20 to 60 minutes sets and perform three to six days per week. Next on the Sweet Life Fitness Pyramid is resistance or strength training. This type of exercise involves body movements, typically focused on muscle contraction or shortening against gravity or opposed by weight.

Under resting circumstances, the cells depend on insulin to help glucose get into the cells to be burned for energy. With insulin resistance in type two diabetes, though, this mechanism can be impaired. However, according to research, muscular contraction stimulates blood glucose transport via a separate additive mechanism not impaired by insulin resistance or type two diabetes. And other words when you contract the muscle, it can take up glucose without depending on insulin.

Mike: I think a lot of people kind of under emphasize the role that skeletal muscle plays like blood sugar metabolism. We focus a lot on -- you know, people are interested in fasting and that's great. I'm not anti fasting I fast a lot myself, diet and everything like that. But what we
realized is that when we really utilize -- I mean, muscle is basically an insulin glucose and leptin sponge.

Okay, so the more lean muscle mass you have, the more fat you burn at rest, the more glucose you can deposit after a meal. And the more insulin sensitive you are if the muscle is healthy. And so you bring up a really good point, and that's that researchers have kind of figured out using controlled different studies where they can radioisotope glucose and insulin and injected into diabetics.

And what they found is that the muscles in the upper body tend to not become insulin resistant, whereas if they look at the leg tissue, lower body, the quads, the hamstrings and glutes, they become insulin resistant first. So there were some papers that were circulating around -- I think researchers in Finland and Sweden, parts of northern Europe have figured this out. There's like I think four papers now in human, so this is not just like a mouse model study.

And I was talking with Dr. Ben Beckman about this. And I think it kind of stems from usage like the legs, humans, we think of hunter-gatherers, foragers. Were on our feet a lot moving around, when tribal community is looking for food or creating food in the garden or what have you. And so many of us, as you know, we're sitting around. We're on our couches watching TV, we're Instagram, we're messaging, we're on the bus, the plane, the train the car. So I think that's a big part of it.

But if we look at diabetic neuropathy, and that happens in the leg first, generally right; you see kind of the reddish discoloration, and people get their legs amputated. So it could be to the proximity from the heart.

So long story short, and I'm sure you can attest to this, a lot of my insulin resistant clients that I work with, some of the men, they still work out, they only do upper body. They have these skinny little legs and they say, “Oh, I used to squat in high school and I played football. But I haven't done that for 20 years.” And it's like, we need to encourage people to just get out there and walk, move their lives. I love squatting and deadlifting. And you don't need to have a fancy gym, you can do air squats, you can do one legged deadlift in your hotel room.

So I just encourage all people, whether it's preventing diabetes, overcoming insulin resistance, or even keto adapting to really kind of exercise their legs, and you can hit the legs several days a week, you know. And like I said, it's great if you belong to a gym, and a lot of people, they live in the country, they have four kids, they don't have time, totally get it. You can get creative and do this stuff at home, which is pretty cool. I like to focus on resistance training for most people.

And that can involve getting a personal trainer. One of the certifications that I look for is a CSCS, which is a Certified Strength and Conditioning
Specialist. So this is someone that can work with you and go, “Okay, Dr. Brian, it looks like you have a low back injury or your hips are out of alignment. Let's create exercises unilaterally to get things working right.” They can help you come up with a program.

There's a great individual gentleman that literally, he focuses on helping women develop their glutes and hamstrings. Bret Contreras, he has this thing called the Glute Lab. And so it's all about lower body. And so you don't have to be a fitness model to get the benefits of his programming, you can just learn some of the exercises, many of which you can do right in your garage or your living room using your couch or coffee table.

So some of the best things that I recommend is -- you know, for the whole body training, at least every muscle group, one day per week. And I like to break it down for clients and make it very simple, because there's all these programs out there; there's CrossFit, there's power lifting, which I personally do. But upper body pulling lower body pulling, upper body pushing lower body pushing.

So you just basically split in kind of planes of your body, cut your body in half, you know horizontally and in the central plane. And so upper body pressing would be like the chest, would be shoulders. Lower body pressing would be more front of the body, so quad dominant type stuff, one legged squats, pistol squats. And then a lot of people have knee issues with age and arthritis.

But once you start moving -- arthritis, a lot of people it's how much weight you're carrying, like overweight people have arthritis. So it must just be a mechanical thing. But actually, when these individuals lose weight, the arthritis in their hands goes away. And so that's what has caused scientists realize, could there be a metabolic factor here influencing the development of arthritis and we know that leptin is involved in creating inflammation.

So for the folks that don't know what leptin is, it's this pleiotropic hormone that is released from our fat tissue. And it directly not only does it affect our appetite and cravings and cause us to crave junk food, but it stimulates the immune system to create more inflammation. So when you start to lose weight, you actually reduce your inflammatory burn, which is great. And so people with our arthritis now may not have it when they start exercising.

So it may not be that your joints are damaged, it could be that your fat cells are releasing this inflammatory thing that's damaging your joints. So lose the fat, joints improve, we see that all the time. So again, you know, splitting body parts into different days and just trying to hit everything at least once a week; you can do this stuff in your living room, garage, work with a trainer if you have the resources.
I like to buy rogue exercise bands. And so these are the red band, the 10 or 15 pounds. I mean, I have this in my suitcase right now, because I don't know if I'll have access to a gym. Just getting a pump, that's all you need, that little stimulus can drive the genes that create your muscles to become more healthier. I don't know what the issue is, I think part of it is you can really lose a lot of weight by just doing diet alone. But diet plus exercise, and many studies have shown this, it's not like one plus one equals two. It's like an additive. It's like an exponential effect. So I like to recommend it for people. And what I recommend for people is do something in a group.

So be friend someone that is more fit than you, learn from them, like people want to teach inherently. And so your fit friend is going to be like, “Oh, cool. Yeah, I have a gym partner. Yeah, you'll hold me accountable. I'll hold you accountable.” Find a group class that you'd like. And here we're talking about how beneficial resistance training is, and I am a huge fan of that.

But look, if great training is not your thing, and yoga is your thing, do yoga. Do orange theory fitness, do whatever it is that's going to get you fired up to do it, because we want people -- I think part of what creates exercises a lifestyle is getting into that flow state. And that's different for everybody. Some people they chill out and forget about their problems in life and stressors, they're hiking outside. Cool, go do that. Like some people say, well, cardio is bad. It's not bad if that's what you like to do. And so that's what I encourage people to do.

**Dr. Mowll:** Resistance training can be done using free weights in a gym, weight machines can be done in classes like CrossFit, or you can do bodyweight exercises against gravity such as pushups or pull ups. Bodyweight exercises do not require weights, instead, you’ll use your own weight to provide the resistance to the movement.

Other examples of bodyweight exercises are squats, sit ups and lunges. For those who hate the idea of going to a gym or overwhelmed with all the equipment there, these exercises are a great way to get started. Another type of resistance training is called plyometrics. This may sound like some weird math class that you should have taken back in high school, but it's actually a dynamic and fun type of training, also sometimes called jump training. The goal of these exercises is usually to increase the speed and strength and overall power.

The training focuses on learning how to move a muscle from extension to contraction very quickly, such as in repeated jumping. Plyometric are typically used by athletes or sometimes weekend warriors to improve performance, but they're becoming more popular with contemporary fitness programs, and can certainly help you to manage your blood glucose levels.
CrossFit has become a popular way to work out, mostly because exercises are always varied, so you don’t get bored and results come pretty quickly. People also seem to like the group nature and community feel of CrossFit gyms. The exercises consist of very functional movements performed at high intensity. What are our functional movements exactly? They’re movements that reflect the best aspects of weightlifting, gymnastics, running, rowing, and more.

These exercises maximize the amount of work done in the shortest amount of time. Of course, if you prefer to go to the gym, or perhaps set up a home gym to use free weights or weight machines, that’s fine as well. The idea here is to simply start incorporating resistance exercises into your blood sugar maintenance program.

If you have the budget, I highly recommend getting a personal trainer for at least a few months, so you can fully learn how to properly lift weights or use the machines and how to do reps in an effective and safe way. Regardless of the type of resistance training, it’s important to build some lean muscle mass, especially as we age. Having more lean body mass increases your metabolic rate, increases your insulin sensitivity as well and improves glucose uptake in the muscles.

I recommend getting in about 20 to 40 minutes of resistance training between two to four times each week, to help build and maintain more lean muscle, burn stored energy and increase insulin sensitivity.

Robb: If one is in that pre diabetic or diabetic state, you have to be lifting weights two to three times a week, this is a non negotiable thing. And this doesn’t mean that you spend three hours three times a day in the gym, you can go in and find a select-arise machine based gym and you go in and you do 10 reps of a lightweight, add a little more weight, do 10 reps have a heavier weight. Keep doing that until the weight gets too heavy to say finish eight or 10 reps, then move to another movement and do a press, a pull, a press, a pull, do some legwork and you’re out. And do something that looks like that two to three times a week. That has shocking ability to improve glucose disposal in the muscles, and it’s non insulin mediated glucose disposal.

I can make a case that because we are so sedentary, we rely exclusively on our pancreas for blood sugar regulation, whereas we should be relying on some degree of physical activity, actually playing a role in blood glucose regulation. So even if you don’t like the gym, like just simply doing air squats and pushups and getting like a TRX setup to do some body rows and doing some full body circuits like that daily or multiple times a week. If we look at the literature, the results of some sort of resistance training -- and if you want to do cardio, that’s great,
but it doesn’t improve glucose disposal remotely the way that resistance training does.

**Dr. Mowll:** The last type of exercise that I’ll discuss in this module is sprint training. This is higher intensity exercise focusing on burning sugar from the bloodstream and stored sugar in the muscles and liver called glycogen. This type of exercise is excellent at helping to deplete stored sugar, which forces the body to get better at converting glucose and fructose to glycogen, and improve sugar metabolism and insulin sensitivity.

A report from 2015 in *Diabetes Spectrum* concluded, there is mounting evidence supporting the potential cardio metabolic benefits of high intensity training in individuals with type two or pre diabetes. Another study reported that high intensity training appears to represent an effective strategy for reducing post meal blood sugar in people with type two diabetes. And at potential improvements in cardiorespiratory fitness, endothelial function and body composition when compared with more traditional moderate intensity exercise.

One particular low volume hit protocol has been shown to be very effective in people with type two diabetes. It involves 10 one-minute vigorous intensity efforts at about 90% of your max heart rate with one minute rest periods. The study found after two weeks training this way at only three times a week, reduced mean blood glucose in type two diabetic patients who had previously been very inactive.

Just a word of caution; the level of intensity should match your own personal fitness level. If you have type two diabetes, you’re over the age of 40 and have been fairly inactive for a number of years. You may find it safer and easier to start training with high intensity interval training by simply picking up the pace of walking for 30 to 60 seconds every few minutes.

By contrast, someone who’s already exercising regularly may find that they have to run uphill briskly to achieve that same level of intensity. There are several types of sprint training that you might want to consider trying. The first is interval training or hit training. This is simply alternating between periods of intense exercise and lighter exercise. So while walking around your neighborhood, you might pick up the pace every few minutes for 30 to 60 seconds. If you’re in better shape, you might incorporate short bursts of jogging into your brisk walking.

Burst Training is similar to interval training and involves exercising it 90 to 100% of your max heart rate for 30 to 60 seconds followed by 30 to 60 seconds lower intensity or rest. This type of exercise is incredibly effective at burning fat. Results can be seen only exercising 20 minutes a day three days a week.
Exercises that are great for Burst Training include running in place, jumping jacks, spinning, and jump rope. The last example I'll give is called Tabata. In Tabata, each exercise in a given workout lasts only four minutes, but those four minutes might be grueling. Essentially, as with other hit exercises, you push yourself as hard as you can for a period of time, and then rest for a period of time; completing eight repetitions is typical.

An example of Tabata workout might look like this; pushups for four minutes, bodyweight squats for four minutes, burpees for four minutes, and mountain climbers for four minutes. And in between each completed set you rest for one minute. Sprint training can be fun and very effective at burning fat and reducing blood sugar over time. I recommend doing it 1 to 3 times each week. And remember, each workout may take just a few minutes, or perhaps up to 15 minutes per session.

Benjamin: We refer to the mitochondria as the powerhouse of the cell. That's because that's the main site of action with the production of the chemical kind of molecules that actually allow the cell to work. And you know, any of the work that that cell needs to do, it's because of the mitochondria producing something called ATP.

So every time I'm muscles contracting and relaxing, for example, the most obvious sign of work or the heart beating, or our body breathing, those actions are mediated because the cell has enough ATP to get that done. So what I'm going to be talking about is how ketones are altering the degree to which the mitochondria are taking in glucose and fat, and then making ATP from that.

What we're finding in general, is that there's two very different or disparate effects with regards to two very different tissues. The ketones are doing one thing in the muscle cells and a very different thing in the fat cells. So it's not just a universal effect. At the muscle cell, ketones aren't really changing things very much, the ketones are just the normal fuel the muscle can use.

And while it's doing a few things, one, the ketones are actually helping muscle cells be more or have a higher degree of viability. So they're a little more stronger, and more resistant to injury. But it also helps the mitochondria go through that process of taking fuel and making this chemical energy in the form of ATP, while making fewer reactive oxygen species. So oxidative stress goes down in that same process.

So letting that happen in a bit of a cleaner environment, so to speak, less pollution, almost in the form of these oxidative stress. But so in other words, still using plenty of carbohydrate and fat to produce plenty of ATP. We call that coupled; those two processes of breaking down the
nutrient and making ATP that processes coupled, it's linked together very, very well. In the case of the fat cell, what we're seeing is that the fat cell is using glucose and fat for fuel, but it's making relatively less ATP. And so we've uncoupled that process. But of course, that chemical energy from the nutrients has to go somewhere. And that's going into the production of heat.

The mitochondria are sort of like an engine, in where, you know, I drive a 20 year old five speed manual Subaru Outback. So because it's a manual transmit, I can be revving, I can have it in neutral, my foot on the clutch, but I'm revving the gas, and I can see the RPM is really driving up, but my speed isn't changing.

So RPM is going up, and speed stays low. We've uncoupled the burning of the fuel from the actual engine doing the work we want it to do. That's kind of what ketones are doing in the fat cell; the engine is revving, but we're not going anywhere. In contrast, in the muscle cell, the engine is revving and we're moving, we're getting speed. So the speed is very coupled to the RPM of the engine.

So I call that the metabolic advantage, where ketones are enabling the muscle cell to do their job maybe even a little better, because it's still letting you get a lot of work out of the fuel you're using, but in a cleaner way, less exhaust in the form of reactive oxygen species. In contrast, the fat cells are wasting energy.

And that's not a bad thing, because that's a tissue that's just storing it, especially in our day and age when there's so much excess energy in people's fat tissue. Everyone has enough fat tissue despair. And so the fat cells are burning through more energy than they actually need. And so it's a little less efficient, but metabolically somewhat optimal.

Dr. Mowll: So at this point, you might be thinking, “How do I fit all these exercise strategies into my life?” Perhaps you already have a hard time just getting out for a walk or feel like you lack the motivation to exercise. Let's talk about how to make this work for you. First, I recommend starting with the base of the Sweet Life Fitness Pyramid with slow fat burning cardio exercise. Then once you've mastered that, you can work your way up the pyramid. The key to getting your exercise time in is like I've discussed on previous modules; planning and preparation. This process of creating an exercise program or prescription is often abbreviated as FIT, which means Frequency, Intensity, Time and type of exercise.

First, decide what you're going to do, when and how often you'll do it. Let's say you want to walk after dinner three nights per week for 20 minutes and swim for 25 minutes twice a week. You would choose the days for each of these exercises, and then actually put it in your
schedule. It's helpful to anchor your exercise to something you already do, such as a meal time or your work schedule.

The last step is doing it, no excuses. Treat this appointment with yourself as importantly as an appointment with your doctor, attorney or account. Plan it, schedule it and do it. After you've reached 150 minutes of level one exercise, it's time to add some resistance training. Just like with cardio, the key is to keep it simple and start slow.

There are 10s of thousands of videos on YouTube and other places online with simple body weight and resistance exercise routines. You can find modified routines that are accessible to anyone regardless of your functional fitness level. You can find resistance exercises that you can do from a chair or in your kitchen.

And of course more complex routines that can be done at home or in the gym. The key is to find something that works for you. Find the time in your schedule to do it and get it done. You only need about 20 minutes at least twice per week, and can do this as often as four times a week if you choose. Finally, you'll add the top of the Sweet Life Fitness Pyramid, which is sprint training. Most people incorporate sprint training into another one of their workouts, such as the cardio workout or their resistance training routine.

This can be done by simply adding a 30 to 60 second burst of high-intensity exercise in the middle or end of your current workout routine. If you're walking, you can walk in a very fast pace for 60 seconds followed by a one to two minute rest. Then repeat that two to five more times, each time resting for a minute or two between reps. Likewise, this can be done with pushups, sit ups, squats, or jumping jacks against gravity or weighted with resistance. This sprint routine should be done at least once per week, and can be done up to three times per week for optimal results. If you want to incorporate restorative or movement exercises, these can be added once all three levels of the Sweet Life Fitness Pyramid have been mastered.

A few more words of caution; please make sure you discuss and clear this type of exercise with your physician, especially if they've limited your exercise in the past. I'm confident that everyone can do fat burning cardio resistance training and even sprint training. If they listen to their body, modify as needed and honor their individual fitness level. That's it. It's important to have medical clearance before beginning this or any exercise program.

It's also important to mention that you need to make sure you have good shoes, dry socks, and inspect your feet every day to make sure you don't develop blisters or other small wounds, which can lead to infection. We'll talk more about this in a future module. But if you see
anything that looks suspicious, especially on your feet, make sure your physician or podiatrist is aware of the issue. And keep your feet clean, dry and healthy.

You may also want to consider carrying a medical ID, especially if you have diabetes and you’re taking medications or insulin. Keep a medical ID card on you or wear medical ID jewelry.

**Dr. Scher:** As a cardiologist, look, I spent 14 years in college and medical school and residency and fellowship. And that type of commitment, I thought I was going to be able to change the world and just change people’s lives dramatically by preventing heart disease. And then when you get into the reality of things, I sort of realized I wasn’t having the impact I thought it was, and at first I wasn’t sure why.

And I wanted to focus so much more on prevention, because the cases I was seeing in the hospital time and time again, I knew could be prevented. And the overwhelming majority of them had some blood sugar issue, and I didn’t quite connect the dots at that point.

So I started a health coaching business. And the health coach I was working with, he was very much into ketogenic diets. And at first I was resistant to his suggestion. But then once I started giving in and instituting, just experimenting with some patients, and I saw the amazing improvements, then I had to go back and do sort of a deeper dive into the literature, into the science.

And that was the eye opening moment for me to realize that the foundation of science, and which I’ve been taught; the low fat, eat less move more. The foundation of science is so faulty. And the strength of the evidence doesn’t support the strength of the conviction of the teaching. And that’s when I realized low carb was this untapped universe basically, that was potentially so effective for so many patients, but was not talked about in the medical community.

And once I started to get experience with my clients, there was no turning back because then that’s when I started to see the impact I wanted to have and incorporating that. And here’s the key that I think is incorporating that into an overall healthy lifestyle; you still have to talk about sleep, you still have to talk about stress, start moving your body and physical activity, still talk about mental wellness.

But if you can combine all that and then with a healthy low carb lifestyle, patients thrive, they feel better, their blood sugar improves, their insulin improves, their weight goes away, their energy improves. And that’s what I want, and that’s why I spent all those years becoming a cardiologist so I can have that kind of impact on people.
Dr. Mowll: Physical activity is clearly one of the most important lifestyle strategies to help reduce and control blood sugar with diabetes or prediabetes. It'll help your body burn more sugar, metabolize more fat, to help you lose weight if you need to, build more lean muscle mass, improve insulin sensitivity and glucose utilization, lower blood pressure and reduce your risk for heart disease, stroke, and other complications. You'll probably never find the time to exercise. So be sure to make time or take time, it will be well worth the sacrifice an effort. You'll feel stronger, more alive and more in control of your health, your blood sugar and your condition.

In the next module, I'll be talking all about how to monitor your health to make sure you get the best results with your blood sugar, to prevent problems and complications of diabetes and high blood sugar and that you are on the right path toward healing. This is Dr. Brian Mowll, the diabetes coach. And I'll see you back for Module 5 soon.
Module 5
Getting Checked - Using Labs and Exams to Stay Safe and Maintain Your Health

Dr. Mowll: Welcome to Module 5 of Diabetes Essentials - check under the hood, essential lab tests and self-monitoring to protect your health. It may not be the most exciting thing to think about, but with diabetes, pre-diabetes or blood sugar problems, it's essential to monitor and get yourself checked regularly. I had a client named Mary who shared a story on Facebook about how she came to see me several years ago.

In my program, Mary was actually able to lose 25 pounds, heal her body and normalize her blood sugar levels. Her doctor even discontinued her medications, because she was doing so well until she wasn’t. She told him how after a while complacency set in and she slowly slid back into bad habits, stopped exercising, and started eating foods that were not ideal for her. Her blood sugar started going up, but she ignored it. Eventually, she ended up in the hospital and had a foot amputated. That was a wakeup call for her. After her recovery, she recommitted to her health and was able to get healthy normal blood sugar levels once again.

I'm sharing Mary's cautionary story, because I don't want this to happen to you, your spouse, or any of your family members or anyone you care about. This is Dr. Brian Mowll, the diabetes coach, certified and master licensed diabetes educator and IFM certified functional medicine practitioner.

And today I'm going to tell you how to avoid the pain and agony that
Mary went through. In Module 5, I'm going to share the strategy you need to properly manage your diabetes and monitor your health to prevent catastrophe. In the US right now, diabetes is the leading cause of adult blindness, lower limb amputation and kidney failure. It's also a major risk factor and contributing factor to vascular disease, heart attack, stroke, sexual dysfunction, and dementia and Alzheimer's disease.

**Dr. Perlmutter:** The numbers as they relate to Alzheimer's disease are really quite profound. We recognize that even right now in America, there are 5.4 million individuals who carry that diagnosis. And that number is predicted to triple by the year 2015. We're spending right now about a quarter trillion dollars here in America to care for a disease that is pretty much preventable by and large.

You know, people want to believe that if you carry the Alzheimer's gene, the so called ApoE4 gene that you're going to get it, and well, what can you do? And the reality is that it is not primarily a genetic disease. It is a disease of lifestyle. It is disease, a disease caused by elevation of blood sugar. And interestingly, it relates to the topic of our discussion today.

This is elevation of blood sugar, even well below what we would qualify as being diabetes. So it happens a lot earlier when blood sugar even begins to elevate to 105. This is associated with increased risk for dementia, a disease for which there is no pharmaceutical treatment.

This is an interesting study published in the *New England Journal of Medicine* in September 2012. That demonstrated, took a group of around 6000 individuals and measured their fasting blood sugar at the beginning and followed them for 6.7 years. And what did they find? They found that those individuals who had elevated blood sugar had a dramatic increased risk for Alzheimer's. But what was really quite intriguing is, this is blood sugar at 105, 110, well below when you are now qualified or diagnosis having Alzheimer's per se.

When we look at another marker of blood sugar called the hemoglobin a1c, which is more along the lines of an average of your blood sugar over a 90 day period. It's important to mention this because it's a lab test that people are kind of familiar with, since it's advertised on TV, in correlation with various drugs that you can take to lower your a1c, so people know about it.

Even very subtle elevations of hemoglobin agency are associated with dramatic shrinkage of the brain, actually in excess of the shrinkage of the brain that’s correlated with the Alzheimer's gene, that you can't change the Alzheimer's gene. But you sure as heck can lower your A1c. And the way to lower your a1c is not by taking a drug and continuing on with these lifestyle choices that are detrimental for you.
The way to lower your A1c is quite simply to take the sugar out of your diet, and at the same time, increase your dietary consumption of good fats. What you want to try to do once you’re A1c is elevated, is to really think about getting on a more ketogenic diet. In other words, being on a diet that’s going to give your body more ketones is being produced. We know that that re establishes the sensitivity of each and every cell to the hormone insulin, so you reduce what's called insulin resistance and you increase insulin sensitivity while you lower your blood sugar.

Dr. Mowll: So let’s talk about the basics first. Probably the most important self monitoring someone with diabetes will do is testing their own blood sugar. Self monitoring of blood glucose levels has several benefits, including preventing highs and lows, helping you reach your target goals, illustrating how various foods impact your blood sugar. Understanding how exercise impacts your blood sugar, guiding insulin and medication dosing, and helping you to assess your progress.

One study in the *Journal of Diabetes Science and Technology* concluded, “Studies clearly demonstrate that frequent blood sugar monitoring improves hemoglobin A1c and related outcomes in type one and type two diabetes regardless of the therapy used. Glucose monitoring facilitates diabetes self management education, and motivates patients to live healthier lives.”

I recommend doing a baseline test at least once a day. This is typically done in the morning before eating or drinking anything and preferably within about 30 minutes of waking. In addition to baseline testing, you may want to check your blood sugar after meals or after exercise, you can learn a lot about your blood sugar control and respond to specific types of food and exercise by checking your blood sugar levels regularly.

Baseline or fasting glucose should be 76 to 92 milligrams per deciliter. 70 to 100 according to the ADA, and less than 140 two hours after meals. If you’re using insulin, you’ll need to check your blood sugar more often in order to properly dose your insulin. A CGM or Continuous Glucose Monitor may also be helpful to avoid repeated fingerpricking and to achieve better control with more frequent data.

Dr. Stanislaw: A CGM is one of the best tools, it is the most powerful tool for good management I’ve ever seen in 40 years, hands down about the pump. I always say diabetes doesn’t kill you, bad blood sugar levels do. And so when you have a CGM, I’m not high anymore for very long because I get instant feedback. It’s in my pocket most of the time.

And if it vibrates, I know immediately I’m high. I can take either a correction dose or go run around the block, and I take action right away to bring it back down. I also have the most perfect luxury levels overnight than I ever have in my life. I can be 80 for eight hours while I
sleep, which is a dream. And it will wake me up if I'm high, it'll wake me up if I'm low. So get to stay in range and the second you're out of range, you're notified.

I've always been a big tester. Before my CGM, I probably tested 10 or 15 times a day. So I still wouldn't let seven hours go by without testing. But I've had diabetes for 40 years. Well, first of all, the first two years I didn't even have glucose testing. And then the next 30 years, there would be hours and hours that would go by and I test and then I'd be 250. I was like, “Oh, was 250 for first four hours and I didn't know it.” And so every moment that you're high, it's doing damage to your body. And now part of me is very sad that I didn't have this 40 years ago.

Dr. Mowll: When checking your blood sugar, there are a few important things to keep in mind. Make sure your hands are clean. Wash them only with soap and water. It's best not to use alcohol or antibacterial gels. Be sure that your glucose meter is accurate and functioning properly. Many people will use older outdated meters which can make the readings inaccurate.

Also, make sure your test strips are not expired and that they're stored properly. They should be stored in their original vial, and make sure that the vial is closed tightly between uses. Before lancing your finger, insert the test strip into your meter and ready the equipment. Be sure to use a new lancet each time you check your blood sugar and discard the old one properly.

It's best to use a spring-loaded lancing device to reduce the discomfort of pricking your finger. Use the lancing device to puncture your fingertip on the outer third of the front or Palmer surface of the finger. Many people will rotate their fingers to avoid irritation. Alternatively, some people use the fleshy part of the palm under the thumb, but this may not be as reliable. It's not recommended to use other areas such as the forearm or thigh, as research has shown too much variability and these alternative test sites. Once the skin has been punctured, you can gently massage the finger down towards the puncture to produce a droplet of blood. Touch the end of the test strip on the droplet of blood, and the meter will begin reading your sample. After a few seconds your glucose reading will appear on the meter.

Most meters store your information and can provide daily and weekly averages. Some provide even more sophisticated information such as pre and post meal averages, and graphs. I also encourage my patients and clients to write down their readings on a piece of paper or in a journal or a tracking sheet.

Many find that it's easier to see patterns on paper, and this gives you a backup in case you misplace your meter or you need to get a new one.
You can also record your blood sugar reading in a smartphone app such as Glucose, My Fitness Pal, Carb manager and others. These allow you to email your results directly to your doctor or diabetes coach when appropriate.

In diabetes education, we described the ABCs of diabetes. These include a regular hemoglobin A1c test, blood pressure and cholesterol which is really more about lipids like triglycerides, HDL and LDL tests. From a lab perspective, though, these are really just the basics.

**David:** Certainly as I've come to understand a lot more within libertology, I am particularly a lot of the studies that are out there. I've come to recognize that actually HDL cholesterol, the so called good cholesterol, and triglycerides, which are a measure of the fat in the blood, are actually extremely important.

And of course, if you go on a low carb diet, you tend to see your HDL go up and your triglycerides go down. You may or may not know that actually, I have an energy model, as I like to call it, that may help to explain why it is that people go on a low carb diet, particularly as they get healthier or if they are, in fact, already lean and/or fit; might see a pronounced increase in their LDL cholesterol, even though they likewise will have often an increase in their HDL cholesterol and a dropping of the triglycerides.

And as of yet, every single study I've been able to find which hasn't been a lot that have grouped all three; high LDL, high HDL and low triglycerides, show a reduced rate of cardiovascular disease. But what it means is your body actually has basically a kind of traffic system on how it delivers things in your vascular system. The way it does it is, if it's something that doesn't mix well in the blood, which are lipids, lipids are like fats, then it makes something which it can carry it with. These are proteins. Lipoprotein is like a lipid carrying protein. And it makes them basically in two places, makes them in the gut from food you just ate, those are called Chylomicrons. And it makes them in your liver, typically from energy from storage. And those are VLDLs.

And I emphasize energy because fat based energy if you run on it, you're going to be trafficking a lot more of these lipoproteins, particularly Chylomicron and VLDLs. And the energy models suggest that indeed, if you are trafficking more VLDLs, they are the precursor to LDLs, as they drop off their triglyceride cargo to fuel your body. It's why you have less triglycerides as you're actually using them more.

Then eventually remodels to an LDL and then will remain in the bloodstream anywhere from two to four days. That in fact, causing atherosclerosis is having a low carb high fat diet, and trafficking more of this, which leaves remaining LDL particles is that driving itself into your
arteries. We have a number of people inside the low carb community we like to call hyper responders.

And there's a particular phenotype that I like to study called lean mass hyper responders. Lean mass hyper responders have total cholesterol -- actually an LDL cholesterol 200 or higher, and HDL cholesterol of 80 or higher, and triglycerides are 70 or lower. And that might sound like a very distinctive specific profile, but you'd be surprised there are quite a lot of people who fit this.

And they tend to be very lean and very fit. But given how high those LDL levels are, they're actually comparable to somebody who has a disease known as familial hypercholesterolemia. Yet, they don't seem to be getting the same symptoms as somebody who has the genetic disease; suggesting that, perhaps, the disease is much more specific to what it is that's resulting in this atherosclerosis, this build up a plaque. Maybe more so than this metabolic reason, which is those people going on a low carb high fat diet.

But the whole process, by which we then say, oh, now atherosclerosis has begun, is not something that we actually have, say, nanocameras on the inside to see when that began. So how do we know that they're not part of the emergency vehicles that are being associated with the perpetrators, instead the perpetrators themselves. I've yet to find any evidence when you have circumstances such as HDL being high and triglycerides being low, that that's associated with atherosclerosis.

In fact, I want to kind of bring up a profile, commonly known in literature as Atherogenic dyslipidemia. And that is very well known to be very -- many would just say straight up causative of atherosclerosis, given how tight the association is, and it has three things in common; has low HDL cholesterol, high triglycerides, and a preponderance of small dense LDL particles.

Now, as I was kind of saying a little bit earlier, I think these three aren't so much driving the disease. I think it's more likely the disease state is being reflected in the lipo profile you have.

**Dr. Mowll**: Blood pressure should be checked each time you visit your provider, and can be monitored at home between visits. Blood pressure should be less than 140 over 90, and optimally less than 120 over 80. Research indicates that about 25% of people with type one diabetes and a massive 80% of those with type two diabetes, have high blood pressure. Having diabetes raises your risk for cardiovascular disease such as heart attack and stroke, as does high blood pressure. Having both is a double whammy, and can put you in a very precarious situation.
As people start to change their diet and lifestyle, including the addition of physical activity, blood pressure can drop fairly quickly towards normal. If you're on medication for blood pressure, it's important to alert your physician about diet and lifestyle changes so that they can help monitor and adjust your blood pressure medications appropriately.

Low blood pressure called hypotension, can make you feel dizzy or lightheaded, nauseous, tired, give you clammy skin and cause blurred vision. If you experience these symptoms, check with your doctor right away. It's also important to look at kidney and liver function tests, blood glucose levels and vitamin D levels.

When evaluating the kidneys, we look at creatinine levels, blood urea nitrogen or BUN, GFR or filtration rate and urine micro-albumin. These tests will help determine the function of the kidneys and alert your physician to any potential problems. One of the most common problems associated with insulin resistance in type two diabetes is called NAFLD or Non Alcoholic Fatty Liver Disease. It's estimated that NAFLD may affect up to one third the adult population in industrialized countries.

Typically, NAFLD is diagnosed by testing liver enzymes such as ALT, AST and GGT. The British Medical Journal published a paper recommending ultrasound testing and using a formula considering liver enzymes, fasting insulin and other factors to determine the presence of NAFLD. Vitamin D levels have been strongly associated with development of type two and pre diabetes.

According to a research article published in Diabetes Care, “Having vitamin D status less than 15 nanomoles per liter, double the risk of newly diagnosed type two diabetes after adjusting for BMI, sex and a number of other characteristics.” It's important to check vitamin D levels in the blood quarterly, and supplement if necessary to bring your levels above 50. We'll talk more about supplementation in a future module.

As a functional medicine practitioner, I also typically evaluate fasting insulin, inflammation markers like CRP, thyroid levels, iron and other micro nutrient levels and often look at advanced lipids such as particle type and count.

Dr. Pompa: What is a toxic cell? A toxic cell is an inflamed cell. Let me pull back into what we know. I think most people watching or listening to this would say, “Inflammation, yeah, I've heard it. It's the cause of all these diseases, including diabetes.” Well, what do we mean by that? I mean, the sore shoulder is inflammation, the cells that are inflamed. But we're talking about typically systemic cellular inflammation, meaning the membrane of the cell is inflamed.

By the way, that's where the hormone receptors are. And that creates
that resistance to the hormone. So toxins are the number one driver of that inflammation. I mean, there are other drivers. Just high glucose alone is a driver, but many different drivers. But toxins that are hidden cause, but really nobody is talking about.

So an inflamed cell, how do we know -- the second part of your question? There's a simple urine test called a Meta-Oxy test that measures something called malondialdehyde, which -- it can look at oxidation, if you will, of the cell membrane. It's an indicator, it's a very simple and easy test. And there's C-reactive protein and other blood markers we could look at and say, “Oh, you're inflamed.”

But you know, really, we're looking at a cellular inflammation in some aspect. But look, most people watching this may not do that. But symptoms, you know, how's your energy, do you have brain fog? Do you have hormone problems? Do you have problems losing weight? Do you have to eat six meals a day or eat all the time? Do you break your diet all the time, because you just can't help but have those carbohydrates? Those are all symptoms of cellular inflammation driven by a toxic cell.

**Dr. Shippy:** The literature really does show that there's quite a link between environmental toxins and diabetes. In fact, in some studies, it's been shown that having high levels of environmental toxins is even more of a risk for diabetes than being obese. But it's so fascinating what I see in my patients that have had a buildup of environmental toxins; they tend to gain weight too, because I think the body's trying to keep the brain, and the heart, and the thyroid, the vital organs as safe as possible.

So it's a lot safer to make a new fat cell or make a bet cell larger and put the toxin into that. So it really is a very relevant topic to think about how to deal with environmental toxins, especially if the patients are already doing all the right things with how much they're eating, and what they're eating and getting exercise and getting sleep and all the other foundational things.

If you're still not getting really good control of your blood sugar, it could really, really help to find a physician that can help to do the testing for environmental toxins. A lot of times, the traditional physicians, which I am. I'm an internist, but then I have the functional medicine training on top of that.

A lot of times they don't know that they can -- how did I actually test accurately for heavy metals, and for pesticides, and for the things that outgas from my mattresses and pillows and carpets and paints and the glyphosate issue with our food. If you sprayed glyphosate, just in the spraying process, it would cover two thirds of the globe.
Of course, we have some areas where there's a lot of farming and there's a lot heavier accumulation there. And that's where we were seeing the biggest risk factors with the endocrine disruption, and with the cancer cases. But the studies that are going on now are going to give us even better information on even what we're getting in our water, and it's even in the rain now. Is that even a safe level for us?

**Dr. Mowll:** So scary.

**Dr. Shippy:** Yeah, that's why I said I want to cry when I actually -- then really have to think about it. And I'm seeing it like -- I find that even my patients that think they're eating mostly organic, I'm seeing high level you know, not zero, not in the green range; I think is the green range for glyphosate. It's higher than green almost every time. So I think that's one of the biggest health crises that we're going to be facing because we haven't had the regulations in place to prevent a enormous distribution of a very strong pesticide on our planet.

**Dr. O'Bryan:** I just had a conversation three months ago with the head of the FDA of India, it's called the FSSIA, about this topic, because 46% of all diabetics in the world are an India. And where's that coming from? And the primary place they've identified is coming from is the environmental toxins and air pollution.

The air is so bad that these toxins, these particulate matter, the heavy metals, they're getting in. They're binding on insulin receptor sites, and it's contributing to the development of metabolic syndrome leading to type two diabetes. So what do you take away from this? Everyone's got to learn where am I be exposed to environmental toxins? And what are they? And then how do I reduce that load.

And most places, some cities have really bad outdoor air like LA, and all that. You run a 10 kilometer in LA, at 6.2 miles, you inhale as much particulate matter as if you smoke a pack of cigarettes. Just running a 10 K, you're trying to be healthy, you do it in an hour, you just smoked a pack of cigarettes. But for most places in the country, and in the world, it's the indoor environment.

So one of the things I tell every patient they have to do; number one, never run your dishwasher during the day. Because the dishwashing detergent soaps are highly chemically toxic, and the hot water in the dishwasher vaporizes this stuff into the air. And the dishwasher is not airtight.

So the scent, and you can't smell it, but the gas gases come out on the dishwasher and your family inhales it. So you need to run a dishwasher, you run it at night when everybody is in bed. And the other thing you do at night is you turn off the wireless every night. Nobody needs wireless
on at night, and you're reducing the electromagnetic toxicity that you're getting. You get air filtration systems in your house.

If you can afford it, you get a whole home unit. If you can't, you get portable units. And where do you keep it? In the bedroom because that's where you spend the most time. And whose bedroom? Your kids' bedroom. If you can only afford one, it goes in your kid's bedroom because we have to protect their brains, because it's the kids that have to come up with the answers to the problems we've created.

You know, Einstein said the problems you've created today cannot be solved with the same level of thinking that created the problem. And all the adults are rigid, we're locked into our neural circuits in the way we think. We need the next generation of brilliant kids keeping their brains functioning well. So if you can only afford one air filtration system, it goes in your kid's bedroom. Now during the day, it can be out in anywhere where the family is, but at night it goes in the kids' bedroom.

**Dr. Carnahan:** People don't realize that the toxic effect of mold usually through ochratoxin, aflatoxin and others. These actually have an effect on leptin receptors. So what we see often after mold exposure is rise in leptin and decrease adiponectin, and this basically diabetic predisposition happening. We also know that mold has a pretty profound effect on the gut permeability. And then endotoxemic effect is one of the predisposing factors of diabetes, as well. Adiponectin we know is a predictive factor for diabetes. So we always look at adiponectin levels as they drop, they're predicting diabetes.

And so when we see leptin and adiponectin are always antagonistic, so one goes up, the other goes down. So we see leptin rise up, adiponectin go down. Leptin is one of the satiety things as well. So people get more hungry, they're satiated, and they eat more and they become obese or gain weight. So often with this cause a weight gain for obesity.

We'll see people who have mold exposure gain 20, 30, 40 pounds in three months, like out of control. And we also know that there's a link here to the intestinal permeability, because mold create more intestinal permeability. And then we'll have the lipopolysaccharides crossover and create an endotoxic effects. And we know now that endotoxemia, which is LPS levels and the CM rising after meals is also predicted diabetes.

So these can all go together. And leptin resistance is really bad in the sense that it blocks ability of cells to burn fat. So they have this double whammy of predisposition towards poor blood sugars, pre diabetes, but they also have a problem with burning fat. So they gain weight, they can't lose weight even if they exercise or change the diet, it can be really difficult.
**Dr. OBryan:** Liver enzymes, specifically GGTP liver enzyme, and if it's in the highest quartile of the normal range. So there's lowest quartile, the next one, the third and the fourth quartile of normal range. Not abnormal, but normal levels of this liver enzyme you have.

And I don't remember if is three or five folds, I don't remember. Three or fivefold increase risk of developing insulin resistance and metabolic syndrome. Three fold minimum, fivefold possibly, I don't remember, developing insulin resistance going into metabolic syndrome. What does that mean? It means the toxic -- and what where does that come from? If you're in that highest quartile of normal range, you've got environmental toxins that are accumulating in your body and in your liver.

And those environmental toxins are activating -- like an emergency brake, you know, when you back out of a driveway and you say, “the cars moving, but what's wrong with this car? Oh, emergency break.” And then you let it down and you back out easily. So these environmental toxins are emergency brakes on the insulin receptors of our cells. So even when you have enough insulin, it can't get into the cell.

And so the cell says I need more sugar, I need more sugar, I need more sugar, but the blood sugar's normal and the insulin levels are normal in the bloodstream. But it's being blocked by these environmental toxins in the receptor sites. Really, really interesting. And it is a contributing component. It's not the primary cause, but it's a contributing component to the development of metabolic syndrome leading to type two diabetes.

**Dr. Mowll:** Despite its common availability and clinical usefulness, most physicians still do not order a simple fasting insulin test on their patients with diabetes or pre diabetes. Based on decades of research by pathologist Joseph Craft, MD, we you have a deeper understanding of the role of insulin and insulin resistance in the pathogenesis of metabolic syndrome, pre diabetes and type two diabetes.

Dr. Kraft studied thousands of insulin essays, over 40 years of clinical research and determines that as patients move towards type two diabetes, they display certain insulin patterns which can be measured using a simple insulin assay. The insulin test can be done as a fasting insulin only or as part of a two hour glucose tolerance test with insulin response. In this case, insulin is measured in addition to glucose fasting, and it's 60, 90 and 120 minute intervals after the introduction of a 75 gram glucose load.

This test helps us determine clinically whether or not you're able to adequately produce insulin, as well as if you are under producing or over producing insulin. This is important information in determining your prognosis and your treatment path. In fact, in a report published in the journal open heart, the authors concluded that, “the insulin assay,
measuring both fasting and after an oral glucose tolerance test seems to be the earliest biomarker for diagnosing type two diabetes, pre diabetes and risk for cardiovascular disease."

Ivor: Well, I suppose you could start with insolence connection to cardiovascular disease and the association type studies. We have everything from raven's landmark study in 2001, where people who had high steady state plasma glucose, SSPG, which is kind of an extraordinarily accurate measure of your insulin resistance.

They had a 40 times multiplier of risk for future events, and an associational study with middle age people. So that obviously sounds very high. But then there are other studies where repeat heart attacks in Colombian man, tracked over seven years, having a higher insulin and insulin resistance was a seven times multiplier of the chance of a second cardiac event.

So we've got all of this association study where these huge risk multipliers for being high in insulin relative to say cholesterol, where it might be a 1.5 multiplier, to have a poor cholesterol profile. But essentially, insulin resistance and hyperinsulinemia it's important that we see that they occur together to be pathological.

So one caveat I always point out is, if you're on a low carb diet with very low insulin levels, low glucose levels in your blood, very healthy, you may actually have a physiological insulin resistance from a long period of eating very little carbohydrates. And if you take a oral glucose test, your glucose may shoot up, because your insulin actually is very low and not ready for the oral glucose. Yeah, so that's insulin resistance in the absence of hyperinsulinemia.

So we always say hyperinsulinemia and insulin resistance in your body together is the challenging environment for cardiac disease and many other modern chronic diseases. So there are many mechanisms; insulin, high insulin causes incorporation of lipids in the arterial wall, high insulin causes fats to gather in your liver and in your organs. And that ectopic fat, in turn causes functionality problems in your organs, and then higher blood glucose and higher free fatty acids.

So insulin resistance and hyperinsulinemia, as well as causing problems in your body, they also act as an excellent gauge that something else is wrong in your body. So if you have high insulin or insulin resistance, something is very wrong. It's not just that the insulin being high is driving issues in your arteries, it reflects a really bad scenario.

And it may be that you have an infectious problem, your insulin and your insulin resistance will rise accordingly. You could have oxidized lipoproteins, or you may be oxidizing your LDL particles, and that will
trigger immune reaction, and your insulin and insulin resistance will arise. If you’re smoking and damaging your physiology, insulin and insulin resistance will rise. If you are very sedentary, overly sedentary, insulin and insulin resistance will rise with time. If you eat too much sugar and carbohydrates, or vegetable, seed oils that will predispose over time to your insulin and insulin resistance rising.

So I think it’s very useful people to realize insulin and insulin resistance are an excellent gauge of many, many different things that can be wrong, including sleep deprivation has been proven to rise insulin and insulin resistance.

So in a way, it’s a perfect gauge for something under the heart that’s very wrong that in turn, that thing will be driving heart disease through many different pathways.

**Dr. Kharrazian:** Yeah, diabetes is definitely one of the key triggers to cause brain inflammation specifically dementia, Alzheimer’s. In the scientific literature, they’re referring to Alzheimer’s as type three diabetes. So we know that when insulin level surge and then key way people know if their insulin levels are surging is they just get really tired after eating, they can’t get their glucose from the liver into the cell, there’s a huge insulin surge, and that changes different energy dynamics, and then the person gets really tiring.

So if you’re diabetic, you’re constantly tired, fatigued after you eat, then that’s also a sign that your brain is getting inflamed every time that happens. So these insulin surges take place in those periods. And they turn on the cells in the brain called micro glial cells, and the brain becomes really inflamed.

And when the brain becomes inflamed, that’ll lead to slowing down nerve conductance. So people will notice that they can’t think as well, they can’t focus, they can’t concentrate. Most people call it brain fog. And that’s a really common pattern. And if that’s persistent and keeps going on, it’s pretty much very strong link that you’re going to develop dementia.

And then this diabetes pattern you have isn’t just a metabolic issue, it’s actually now going to lead into significant brain degeneration, and most specifically, Alzheimer’s disease, but other types of neurodegenerative disease as well. So insulin actually activates a known pathway, they call it the RAG pathway. And that creates these inflammatory mediators that are released systemically. And those inflammatory mediators can cross the blood brain barrier.

And they turn on cells in the brain called micro glial; 90% of the brain is actually micro clear. And they activate these cells to create an
inflammatory cascade. And then that causes neurons that were in the brain to start to get injured, basically, and they start to degenerate. And there's also a process they call tau phosphorylation.

So there's a protein called tau. And it should be at end of the microtubule of a neuron, like the structure of the neuron. But what happens in this inflammatory reaction is, this tau dislocates and they cluster together. And that becomes a tauopathy. And then this starts to create the whole process that's involved with the development of Alzheimer's disease.

And there's also some research that showing higher HBA1c levels are linked with blood-brain barrier breakdown. So they're supposed to be a barrier that protects our brain from chemicals or pathogens and other inflammatory triggers to get into our brain. So we know that HBA1c levels be very high that creates what's called oxidative stress and this oxidative stress starts to break down the blood-brain barrier.

So not only this inflammatory milieu cross the healthy blood-brain barrier, but when you have uncontrollable insulin surges, you create this oxidative stress response that breaks down the barrier, now your brain is really in trouble. So if your brain has breached blood-brain barrier, and now you have activation of inflammatory milieu from the insulin surge, it could be devastating.

Dr. Mowll: Another test called C peptide is related and also useful; the C peptide test has been shown to be a reliable indicator of internal insulin production. Even among those using insulin to treat hypoglycemia, this test can help ascertain residual beta cell function in those patients. In addition, studies have indicated protective benefits to C peptide against brain and endothelial damage.

An article in the journal Diabetes Therapy concluded, “C peptide is a useful indicator of beta cell function, allowing discrimination between insulin sufficient and insulin deficient individuals with diabetes. High sensitivity CRP, the C reactive protein test has been used for many years to reveal inflammation, typically caused by infection. The high sensitivity test measure smaller amounts of CRP and has a strong correlation of cardiovascular risk, which is the major co morbidity and cause of death in patients with diabetes and diabetes spectrum problems. Additionally, studies have shown that high sensitivity CRP may be a surrogate prognostic marker for patients with diabetes, indicating that as glucose levels rise, so do CRP levels.”

Dr. Menolascino: In cholesterol testing, there's four parts; the total cholesterol, the good one and the bad one. And what we do for women is we take their total cholesterol divided by their good one, and come up with a ratio of the risk. I don't know about you, Brian, but I take care of
people not ratios. I don't like treating ratios, I want to personalized one more step.

So we take the bad cholesterol and break it up into its parts. It's got two non sticky parts and two very sticky parts. And there's one called lipoprotein A that encouraged every woman to get check. Its resistant to the club drugs, they don't affect it at all. And it's a hereditary risk for some women as well. So it's this sneaky, hidden, inflammatory molecule that drives this process of building plaque and making the plaque unstable.

There are also some inflammatory markers. And you and I have talked about diabetes with this inflammation component. That's why these are also related, that you've got to put the fire diabetes out to put out the fire risk for the heart disease. But the inflammatory markers are three; C-reactive protein, and two new ones called Myeloperoxidase and PLAC2.

So lipoprotein, CRP, Myeloperoxidase, PLAC2, those are the four inflammatory markers that will tell you are you at risk of an event. No, we can actually identify those people who are at immediate risk. A lot of doctors were not taught about these particles, they weren't taught that inflammations, the main component that drives heart disease. And for women, there's a unique way we want to evaluate them.

A treadmill stress test is not a great test, if you're fit at all, to decide if you have heart disease. You want to add what's called an echo ultrasound, or they do a stress echo where you run on the treadmill. At the very end, they put an ultrasound probe to look at the walls of the heart to see that they're moving, not just looking at the electrical pattern. For women, they tend to have more valve heart problems.

So you get to look at the entire heart, the walls, the valves and the blood flow. So it's a great way for women to get sure whether she has a problem or not. And you just tell your doctor, “I remember Brian and Dr. Mark talking about I need something else besides the treadmill stress test. It's called a stress echo.” And that's really, if you want to get evaluated if you have a problem. That's the best way for women.

**Dr. Mowll:** People will often ask me how to get their doctor on board with this advanced lab testing, that they may not be familiar or comfortable with. I found the best strategy is to present the idea in a respectful way, and backup your request with a small amount of information and research.

For example, if you want your physician to order an insulin test, you can look on PubMed for studies about insulin levels in people with type two diabetes or the HOMA-IR score, and print off an article or two to share.
with your physician. Then tell them you'd like to have the test done, and ask if they'd be willing to order it for you.

In my experience, if it's a sensible request, about 90% of physicians will comply. Sometimes the doctor may not see the need for the test and declined to order. In that case, there are direct patient lab companies where you can get the test done on your own for a small out of pocket cost.

**Joseph:** So there are a lot of misconceptions running around genetics. And when I see people afraid of getting their genome sequenced, it especially means that there are misconceptions around that, because, for example, two of the most common genes that people are afraid of are ApoE and BRCA1 as examples. And that's not necessarily related to diabetes, but ApoE may be a little.

You know, most like Alzheimer's or breast cancer, and people think like, “If I have these genes, there's nothing I can do about it. I'm just going to be dying, and I'm going to get anxiety about it. Am I going to die in 10 years?” That's a huge misconception. So we have an ApoE report, the whole report tells you exactly what there is to do about it.

There are actually hundreds of studies about how you can counteract the genetic weakness with ApoE. Now, some of them are in animals, but you also have a lot of human studies as well. And so that's one example. Genetics can seem like this massive kind of jungle, because You have 20,000 genes, how are you supposed to narrow down what you're interested in.

And the approach that we've taken is an approach that I think needs to be taken for -- this is how people need to think about it. So first of all, your genes don't determine what happens in your life necessarily, right? We're not at a point where we can diagnose and say, if you have X and Y gene, you're going to be diagnosed with these diseases. You could have BRCA1, ApoE, MTHFR, whatever you want. And you're not going to have any kind of issue from these genes.

And the reason is, because they always interact with a whole bunch of other variables then interacts with other genes. They interact with lifestyle variables, diet, everything. You know, nutrition, there's just so many things that they interact with.

So taking diabetes as an example, as you know, there are some people who could be trying everything and anything, and they still seem to have problems with their blood sugar. It's like, why am I doing this. And then there are people who eat junk all day and they still don't have a blood sugar problem. Now, those are two ends of the extreme. Usually, it's a combination, like, you know, they might be doing some things and
they're still having problems. So that is genetic, right. And so, if you already have a genetic problem, if you already see you're predisposed to having diabetes, then you focus in on just diabetes. And so now you narrowed down the field to 20,000 genes to 100 genes that are very important. And out of those hundred genes, maybe 50 of them, you can influence.

And so you know, you're already dealing with a starting point of 50 genes, it's not that overwhelming at that point. And out of those 50 genes, you might be only weak in 10, or 15 of them. So now you've narrowed it down from 20,000, to 10, to 15 genes that you most care about, and that you can do something about that will make you healthier, and more targeted. As an example of a gene that's very important in diabetes and blood sugar control is TCF7L2.

So this kind of gene is actually quite important because it controls other genes. But one of the most important aspects of this gene is that it lowers GLP-1, Glucagon-like peptide-1, which we know is important in diabetes, and there's drugs that increase this. DPP-4 inhibitors, dipeptidyl peptidase-4 are an example.

So you have drugs target this. And if you have a gene that causes your GLP-1 to be lower, that will cause problems with blood sugar control. Now, SelfHacked, which is my other website, we have a list of 20 ways to increase GLP-1. So if you have this variation in that gene, the TCF gene, then you want to make sure that you're doing at least one or two things or a couple of things that are going to help your blood sugar in general.

Most of the things that are increasing GLP-1 are going to be good for blood sugar. And one of the most common ones could be fiber; maybe increase your fiber. You might be getting some fiber, but you know what, here is the bio hack, try to increase your fiber if you have this gene. Another one is Berberine. Berberine is a drug that can increase GLP-1. It's not a drug, it's actually a supplement. It's a natural supplement that's sold over the counter in the US.

And so there's examples like -- okay, Berberine we know is good for diabetes anyway. So we know it's good for blood sugar control, you might recommend it anyway. People might take it anyway. But having another piece to the puzzle, saying that, “Okay, I know this has another reason to help me that I didn't realize before.” And that's how genetics should be viewed these days.

**Andrea:** Oftentimes, especially today, we're very attached to the idea of the genes. And yet we know that the genes load the gun and the environment pulls the trigger. The epigenetics are the environment, they're basically everything that surrounds the gene and turns those factors on or off.
So just because we have a genetic determinant, doesn't mean that it
determines our outcome. Just because we have a genetic factor, I should
say, doesn't mean it determines our outcome, the epigenetics or what
turn on or off the expression of the genes that we have. And that's
where we really have to spend more time making change. It's also where
we as patients are more empowered to make change, because it's the
stuff we do between our doctor's visits that matters most. And it's not
destiny.

I'm working on a new paradigm that I'm thinking of as three routes,
many branches, and diabetes, whether it's type one, or type two is
a branch, it's not a root. And this is where we can get very confused
and thinking we have to address the root for everything to express
healthfully.

But the roots are different than the diagnosis, the diagnosis is often
a tipping point of other factors. And if we can understand those roots
and one of them is genetic predisposition. So one group means you're
primed if you give your body the factors to express that condition, but
there's two other roots. And we have the ability to influence those roots.
It's in our power.

**Dr. Mowll:** What are those?

**Andrea:** I think of the three roots as genetic predisposition, gut hyper
permeability or leaky gut, so making sure that our digestive system is
functional and some element of inflammation, it could be an infection,
it could be an environmental toxin, but it's something that's contributing
to inflammation; our insulin levels and our blood sugar levels are
contributing to inflammation. So it understands, clinically, what are
the factors for one individual in those three areas that we can start to
address that lead to more healthy branches.

**Dr. Brighten:** So we want to look at thyroid function and the first
thing you need to do is have a complete thyroid panel. So TSH is what
your brain says to your thyroid. So understand that if your doctor
only measures TSH, they're not measuring thyroid function. They're
measuring brain how it's signaling to your thyroid gland.

So you have to follow up and test free T4 and free T3. Free T3 is going to
be your mood, your metabolism but also why we have regular periods
and we can be more fertile. And now if your thyroid is struggling, you're
going to see your sex hormones struggle as well. We see increased
incidences of miscarriage, infertility, weight gain and a lot of things
that you know can sometimes be attributed to cortisol or to estrogen
dominance. And it really lies in thyroid gland function.

Every single woman needs to have antibody testing, anti TPO and anti
thyroid globulin testing. And if you've ever had this testing, and it's come back negative -- if symptoms come up, you absolutely need to test again because autoimmune disease can be triggered at any point.

And we know that the number one cause of hypo, which is low thyroid function, the most common kind of thyroid dysfunction, is due to an autoimmune disorder known as Hashimoto's. So women need to be screening for these things because just having elevated TPO antibodies without thyroid dysfunction, so your thyroids still operating fine. That actually is correlated with the increased incidence of miscarriage and inability to conceive. So it's a very important marker for us to look at.

Now, if your thyroid gland is functioning optimally, and you're like, "I'm still having PMS, and I'm feeling terrible." We certainly want to address that and look at, well, are you estrogen dominant. And with estrogen dominance, there are a couple of kinds that we can be working with.

One is you get a frank estrogen dominance, so you're making way too much estrogen, perhaps, because of environmental toxins, and maybe it's because you don't poop every day and you're not moving your estrogen out. We know dysbiosis in the gut can re conjugate, that means reactivate estrogen and put it back into circulation. But something most people aren't aware of, is that your fat tissue will actually make estrogen as well.

And the really interesting thing about fat tissue, it increase adipose as we know it; it's correlated with increased incidence of insulin resistance. It also can cause dysfunction in the adrenal glands, and our sex hormones overall just by way of being an endocrine organ itself. And so we have to look at, is it that you're not ovulating, or when you ovulate, the progesterone is not getting up to ample amounts. Now we've got relative estrogen dominance. Estrogen is fine, but you don't have enough progesterone to really balance it out altogether.

Dr. Mowll: In addition to regular lab testing, there are some specific tests that you need to be doing regularly, at least once per year. It's important to have a comprehensive physical exam, a thorough neurological foot exam and a diabetic eye exam with an eye specialist. These are not optional. To protect your health, you need to make sure you're monitoring your at-risk areas.

It's also important to inspect your feet daily. Small ulcers or wounds can easily become infected leading to sepsis or localized infection, which can become quite serious. The feet of a poor blood supply, which is even more compromised with diabetes, and they may heal very slowly and lack a robust immune response. These infections can result in gangrene and tissue death and mainly to amputation.
One of my patients about 10 years ago, experienced the nightmare that enters the minds of everyone with diabetes at some point. His name is Jim. When Jim first came to see me in my office outside of Philadelphia, his blood sugar had been very high for a long time, with A1c over 10 on the first lab tests that we did. After about a week his blood sugar was steadily improving, and he was starting to feel better with more energy.

He was motivated to normalize his blood sugar, and wanted to do whatever he could to get there. Jim hired a personal trainer, and started exercising regularly. A few weeks later, Jim noticed a blister on the outside of his foot just below his small toe. He put a bandaid on it and assumed it would gradually heal. A few days later, he noticed that it was swollen, had developed a red ring around it and was now an open sore.

Unfortunately, the sore began to get worse until he found himself in an urgent care center, where they sent him immediately to the hospital. Eventually, his surgeon attempted to close the wound with a skin graft that did not take. Fearing the infection would spread, the doctor recommend that Jim have his toes amputated.

As Jim recounted this story to me the next time I saw him, my heart broke for him. I don't want this to ever happen to anyone else, including you. If you have diabetes, or blood sugar problems, take good care of your feet. Inspect them every day, keep them clean and dry, keep your nails well groomed. Don't overclip them, but don't leave them too long either and prevent dry cracking with a good quality moisturizing cream made for that purpose.

It's helpful to use a flat mirror placed on the floor to visually inspect your feet for problems that can be treated quickly and easily, rather than waiting and requiring major intervention. Diabetes and blood sugar problems can be insidious, and sneaky. Don't get caught not paying attention and suffer the consequences of a preventable diabetes complication.

A little bit of maintenance goes a long way. Get your lab test done regularly. See your physician for an annual physical exam. Have your annual foot, eye and dental exams. Check your blood sugar and feet every day. Stay on top of things and you'll stay in control of your blood sugar and your health and have the best chance to live a long, healthy life.

In my next module, I'll be discussing the stress connection and how mental, emotional and physiological stressors can impact your blood sugar and even cause diabetes. I'll give you some practical strategies to beat stress, to optimize your blood sugar and your health. This is Dr. Brian Mowll, the diabetes coach, and I'll see you back next time for Module 6.
Module 6
How Stress Affects Blood Sugar & the Mental Side of Diabetes


If I stopped ten people on the street and asked them what caused type 2 diabetes, what do you think the most common answers would be? I'd probably hear answers like eating too much sugar, being too fat, not exercising enough, sitting too much, junk food, and other related answers. If I interviewed most practicing physicians, and asked them the same question, the answers likely wouldn't be much different. Perhaps they'd say, “There are genetic factors. It's a defect in the pancreas, the organ that makes insulin. Or insulin resistance from being overweight and too sedentary.” Regardless of the answer, the focus would likely be on diet, exercise, and bad genes.

This perception, while not entirely incorrect, is far too simplistic. And it ignores one of the most common and important causes or contributing factors to blood sugar problems, including pre and type 2 diabetes, stress.

This is Dr. Brian Mowll, the diabetes coach, certified and master licensed diabetes educator, and IFM certified functional medicine practitioner. And today I'm going to help you to understand the connection between stress and diabetes. And give you practical strategies to manage stress.
to improve your blood sugar control. Can stress really cause diabetes, you might be thinking? Well, yes. Certain types of stress can lead to a hormone cascade which raises blood sugar and prolonged exposure to these hormones and stressors can eventually lead to chronically elevated blood sugar found in pre and type 2 diabetes.

**Anna Cabeca, DO:** So, our hormones, we have 150 circulating hormones or so in our body. But the major ones, being like the professors at the head of the classroom would be insulin and cortisol. With the head of the entire department being oxytocin. Oxytocin being the crowning hormone. Our hormone of ultimate love and connection. And it has such an influence on our physiology. But in my search to make it simple for me, it was to get to the main players, right?

And so, that’s why we have to fix cortisol and we have to fix insulin. Because, again, when we are stressed, when our body is inflamed, when we are insulin resistant, it’s affecting estrogen and testosterone. So, we’ll get a lot better from our natural hormone production if these guys aren’t on a rampage essentially. And are chill and calm down, then estrogen, progesterone, and testosterone can have its role in our body to what it is supposed to do. It is to be our nurturing hormones, our rebuilding hormones, that can only occur in this delicate balance.

Now, oxytocin is something that I knew well as an obstetrician. But in my book, I also talk about the effect of chronic stress on oxytocin. When cortisol goes up, oxytocin goes down. And when cortisol is up too long, too high, to keep it from frying out our nervous system, our power ventricular nucleus in the brain will suppress it back down.

So, then we get this low cortisol, low oxytocin. And what we experience when our physiology is there, we experience burnout. We experience disconnection. I always say, when you go into a restaurant and you see someone who was a longtime friend and you pretend, you’re not even there, you ignore them, right? You don't engage in conversation. You prefer to stay home and alone versus being social. That's loss of this powerful hormone, oxytocin.

And as we get older, as we enter the second stage of our lives, the most important things to us are these relationships that we have. It is the love in our life. It is the things we are so glad that we have done today or yesterday that have made us smile. The warmth, love, and relationships within our families and our own households. That’s oxytocin. We get that from oxytocin.

So, to empower oxytocin, we've really got to control cortisol.

**Dr. Brian Mowll:** The hormones that respond to various negative stressors include cortisol and adrenaline. Both of which stimulate the
liver to release glucose. In addition, elevated cortisol has been shown to increase insulin resistance. Which makes us store more fat and leads to higher blood sugar levels. These hormones are released by different parts of the adrenal glands. As part of our fight or flight stress response.

**Marcelle Pick, NP:** So, have a culture now of people that are so stressed out. I mean, especially the women that I see in my practice. They often times have jobs, they have children, they have aging parents. They are still on the internet on a regular basis with e-mails. And they are so spent. And they can't figure out why. So, they have blood work done. Their blood sugars are trending up. Their practitioners saying to them, “You might want to change your diet.” But it's a much bigger issue than that.

And the reason for that is that if you have a lot of stress for a long time, what happens is that cholesterol normally makes our sex hormones. And when it doesn't do that anymore, it has to make cortisol. Because we can't live without cortisol. We can live without our sex hormones. So, our estrogen levels get low. Progesterone levels get low.

And DHEA and also testosterone, which causes people to say, “I don't have a sex drive anymore.” And they feel horrible. But they're producing more and more cortisol because the stress is there. When that happens, it really pushes the adrenal glands. And the adrenal glands are very, very important for glucose control. And also, for fluid retention.

So, people coming in complaining, “I can't figure out why my blood sugars so unstable.” And then when we address the adrenals and help normalize the adrenals, their hormones can come back into balance. And I think what happens for a lot of people is that their blood sugar starts to stabilize then. But we have to deal with what I call upstream issues, which is the adrenals first.

So, we as a culture in medicine, the endocrine society came out and said, “There's not such thing as adrenal fatigue.” Well, the name is probably wrong. They are probably right in that regard. But I see people in my practice daily. When I look at their adrenals, they are horrible because they're so stressed out.

And then all the implications that you’re talking about with diabetes, with blood sugars, feeling terrible, but the blood work is pretty much normal. And as we address the adrenals, then all those hormones come back into balance. The thyroid normalizes. Their digestive system normalizes. So, it's all interconnected and all what I call upstream effects of too much stress.

**Dr. Brian Mowll:** Cortisol released by the adrenal cortex is a very important hormone in the body and has many functions. Cortisol is in
a class of hormones called glucocorticoids because of its substantial involvement on glucose metabolism. Most notably, cortisol stimulates gluconeogenesis in the liver, which is the production and release of new glucose from amino acids and triglycerides.

As part of this mechanism, it causes the breakdown of muscle tissue to free up amino acids. Cortisol also inhibits the uptake of glucose by muscle and fat cells. Keeping glucose in the blood longer. Several studies have shown that as cortisol levels increase due to chronic stress, insulin levels also rise. This leads to greater fat storage. Particularly in and around the organs. To make matters worse, chronically elevated cortisol has been shown to make ourselves more resistant to insulin, especially the liver.

**Christa Orecchio:** 80% of us are walking around in fight or flight mode or we’re spending time in the wrong nervous system. So, we’re mostly, what’s called sympathetic dominant. So, we’re living in that fight or flight mode where we’re constantly secreting adrenaline and cortisol in response to everyday things in life, right? Not in response to stressors to keep you safe. We should be living in that nervous system only when crazy things are happening, and we need to access this.

But what’s happening, and we are a nation where we love our coffee, our sugar, our alcohol, and we love insane productivity at the cost of self-care. So, we’ve now flipped. And so, the branches of the nervous system are also flipped. And we can’t click over into parasympathetic dominance, which is rest, digest, and heal. Which is why so many people have digestive problems, adrenal problems, thyroid problems. And to your point, diabetes, right? Because the adrenals in the thyroid, they have this mutual control over your metabolism.

And if you’re living in this state for any length of time, what happens is you completely lose the ability to regulate your blood sugar. And your body is trying to compensate and keep you alive like you’re stranded on a deserted island, right? By secreting stress hormones and it forgets how to use carbohydrates in healthy way.

And so, what’s happening like if we were in stress mode and on a deserted island? Your body would go to fat first. It would burn the ketones in the fat. And then it would move to protein and start wasting the muscle to keep you alive. And we are inadvertently forcing our bodies to operate that way. And that takes just such a great toll.

**Dr. Brian Mowll:** Adrenaline or epinephrine is another hormone that’s released by the adrenal glands during acute or prolonged stress. This hormone may have an even greater impact on blood sugar levels. One study showed that glucose output increased by 50% when adrenaline levels were raised. Mostly due to increased gluconeogenesis. Reduction
of glucose disposal. And the breakdown of glycogen, the stored glucose in muscle and liver cells.

These two hormones in addition to growth hormone and glucagon make up a category of hormones known as glucose counterregulatory hormones. They raise your blood glucose levels and oppose insulin. These hormones naturally rise in the morning as we’re preparing to awaken and engage in our day. They are at least partially responsible for the rise of blood sugar that many people with diabetes and prediabetes see in the morning known as the Dawn Phenomenon.

**Dr. Jody Stanislaw:** And another I teach a lot of patients about is called the Dawn Phenomenon. And cortisol is the stress hormone. But yet cortisol in excess is bad for you. But actually, it has a role. 24 hours a day, it has its own cycle. And we need that. And in the morning is when it’s at its peak. Well, cortisol, that’s what it does, it tells the liver to put glucose out. So, I can wake up with a perfect blood sugar level and double my blood sugar level within an hour of waking up. Simply from waking up. Because that’s when cortisol is at its peak, of its natural, non-stress induced, 24 hour cycle.

So, people don’t understand. People say, “I didn’t eat anything. And I’m 200.” And I said, “Oh, that’s just your Dawn Phenomenon.” And they say, “What do you do?” I say, “We are just going to have to give some fast acting.” And they’re like, “Wait, a minute, I thought I could only get fast acting when I was eating.” “No.”

So, all these little tools and tips that are life changing. I’ve spent one appointment with patients and they’re like, “I learned more from you in one hour than I have in 40 years.”

**Dr. Brian Mowll:** Helping to regulate these hormones, as well as insulin, and the body’s response to insulin is the key to normalizing morning blood sugar levels and eliminating the Dawn Phenomenon.

**Ari Whitten:** We are all tied to the sun. And I think as modern humans, we’ve kind of forgotten that. You know, we’re indoor lights. We’re living indoor lives. And right now, we’re sort of in a room with these fluorescent lights right around us. And as modern humans, we’ve really gotten used to this, as the norm. And we’ve, I think forgotten how connected we are to the rise and fall of the sun.

But the truth is that we are. Because it’s been programmed into us by millions of years of evolution. And that is the fundamental reason why we go to sleep at night. And why we wake up in the morning. It’s not through our conscious decision to do that. But just think about that. Every night, our biology, our brain switches into an entirely different state of consciousness for six, seven, eight, or nine hours. And then
again through no volition of our own, we sort of wake up, then we switch again into a different state of consciousness, and then go about our day. And then again do the same thing the next night.

That is orchestrated by lots of different neurotransmitters and hormones that are all following a particular sequence that is actually according to a 24 hour period, which is sort of dictated by the rise and fall of the sun. And it's mainly controlled by this circadian clock that we have in our brain. In the part of the brain called the suprachiasmatic nucleus. And the main signal that controls that is light.

So, that's what I mean when I say that we're tied to the rise and fall of the sun. We're tied to light and darkness, that feeds back through our eyes, through nerves, into this circadian clock. That then impacts on all kinds of neurotransmitters and hormones that impact our mood, our wakefulness, our energy, or our sleepiness. And as well as things like hunger, appetite, blood sugar regulation, and metabolic regulation. So, whether you're inclined to gain fat or lose fat and lots and lots of other processes.

As I said, one of the big problems is that we have become disconnected from the sun. So, it is mainly light. And specifically, light in the blue wavelengths. And to some extent the green wave lengths. So, if people don't know what I mean by that picture, like when you learn the colors of the rainbow. And if you filter sunlight through a prism, you get sort of the color separation. Those are the different wavelengths of visible light that are visible to the human eye. And it's red, orange, yellow, green, blue, indigo, violet. And then it gets into UV.

So, those are the colors of the spectrum. It's specifically the blue and green wavelengths that most strongly affect our circadian clock. And those wavelengths give our brain the signal, it's daytime. It's the time to be awake, alert, active, and energetic, okay? And part of what happens then is a series of neuro-transmitters correspond to that. So, for example, orexin is a main one. That's wakefulness neurotransmitter. But also, things like serotonin, dopamine, as well as Gabba, are all intimately tied to the circadian rhythm.

And so, and then there is also a hormonal aspect of this. Which is, thinks like cortisol is released in the morning to create surge of blood sugar. And so, there is a relationship of the cortisol release which also follows this circadian pattern to how our body regulates blood sugar levels. And a number of other hormones that tie into, leptin, ghrelin, thyroid hormones, and lots of other hormones that impact on energy, metabolism, and blood sugar regulation.

And then at night when the sun goes down, we're supposed to not have really any blue or green light entering our eyes, okay? And you know,
the only light that would be available in that setting is fire light. Which basically doesn’t have any blue or green light. It’s pretty much yellow, orange, and red light, which doesn’t impact our circadian rhythm.

So, at that point in darkness or in light of those wavelengths, that’s now sending a signal. It’s dark. It’s the time for sleep, rest, and rejuvenation. That’s how our circadian rhythm is designed to work from millions of years of evolution. The problem is, we now live in a modern world where we have indoor lighting. We have TVs. We have computers. We have iPhones. We have car lighting and street lighting. All of these sources of manmade artificial light, which unfortunately emit lots of blue and green light that are then sending our brain the signal, it’s the time to be awake, alert, active, and energetic. And that is fundamentally the main cause of circadian rhythm disruption in the modern world.

We’re not getting nearly enough of the sunlight exposure and the bright sunlight exposure that we should be getting in the morning and throughout the day. And then in the nighttime, after the sun goes down, we’re getting way too much blue and green light from all these artificial light sources that we shouldn’t be getting.

And so, the end result is, if you picture your circadian rhythm as sort of, like a waveform, with a peak and a trough. What you want, if you have a strong circadian rhythm is you want a big peak, you want strong signals telling your brain it’s the time to be awake, alert, active, and energetic. And then you want a big trough. You want the right signals into that clock in your brain, so that it can regulate all those neurotransmitters and hormones telling it, it’s the time for rest, rejuvenation, and sleep.

And if you start to throw off those signals, you blunt the peak and you blunt the trough. So, you’re not as awake and energetic as you should be. And you don’t sleep as well as you should be. Now, what that translates into in practical terms is, what we have in the modern world, we have an epidemic of fatigue.

And we have an epidemic of sleep problems and insomnia. And a big part of both of those things, they are sort of two sides of the same coin. Energy levels and quality of sleep and they are linked by the circadian rhythm. So, that is certainly a big piece of the energy puzzle. And it’s also a big piece of the blood sugar regulation and overall metabolic health puzzle as well.

Dr. Brian Mowll: Several studies have demonstrated that connection between stress, blood sugar, and diabetes. One such study published in the journal, Stress, in 2015, concluded “Chronic stress and endocrine stress responses are significantly associated with glucose intolerance, insulin resistance, and diabetes mellitus.”
Another in *Diabetes Care*, in the year 2000, the authors concluded, “Stressful life events which indicate chronic psychological stress are indeed associated with undetected type 2 diabetes and with visceral adiposity or fat.” In a comprehensive review article in, *Diabetes Spectrum*, stated “In summary, research has indicated that stressful experiences have an impact on diabetes. Stress may play a role in the onset of diabetes. It can have a deleterious effect on glycemic control and can affect the lifestyle.”

This is probably not that much of a surprise to you, now that I've described it to you. Stress is pervasive in the lives of most people today. And seems to be largely unavoidable. Especially when we consider the totality of stressors. When you think of stress, you probably imagine a feeling of overwhelm. Having too much to do with too little time. Financial struggles, negative family dynamics, or work challenges. While these are all forms of stress, these only just scratch the surface.

To really understand the personal implications of stress, we have to look at all forms of stressors, which include not only daily life stressors, like the ones I just mentioned. But also, major life events. Such as loss of a loved one, a job change, relocation, divorce or separation, personal illness, and others. Some of these events may have happened years ago. But still have an impact on your life today.

**Niki Gratrix:** The issue is that, when we talk about the word *stress*, which is wildly overused word. Most people think of stresses, you know, taking the kids to school, having to many e-mails to deal with, just you know, the day to day stresses. But actually, the cause of most stress is a lot deeper than that. And the biggest cause of most stress that people have, is actually set up in childhood. And people don't realize that early life stress.

Actually, when our brains are still developing, as the body's growing and our brains are still growing. It's very imprintable. So, stress that occurs in early life, actually gets imprinted on the brain. And we are kind of primed or we are wired to have a stress response.

So, if we've had a lot of early life stress and we'll talk about what we mean, by what do you mean by that, we'll go into that. But just in terms of the mechanism, if we have early life stress, we are literally building neural pathways and changing the epigenetic expression of things like the glucocorticoid receptors in the brain. Which is what it takes to cause a stress response.

So, if you had early life stress, it takes less of a stressor to cause the stress response. So, our threshold is lowered basically. But what do we mean by early life stress? Well, it's actually also called developmental trauma, early life stress. And it's things like, parents separating or
divorce, which is always seems incredibly common. Things like a physical, sexual, or emotional abuse. It’s also things like physical and emotional neglect.

I think we have an epidemic of emotional neglect by the way. Just not being seen and validated emotionally, which is often the source of a lot of shame and loneliness, which is also a massive epidemic going on now as well. Which we know is also correlated with negative health outcomes.

And it's also things like substance abuse in the family. And things like domestic violence. It's actually all things, early life stress and developmental trauma, the majority of it is all our relations with OP, other people. So, it's all relations with parents, authority figures, our key caregivers basically. So, a lot of people might think of trauma as kind of like maybe having a hospitalization for an illness, which is very traumatizing for a child. Or a car accident, being in a catastrophe, some kind of weather even for example. That’s actually extremely rare. The vast majority of people have had this kind of type of early life stress.

What the research shows, first of all is that 67% of all adults have had exposure to one of these types of early life stress. That was probably an underestimate. Because it's very hard to self-report if you've had emotional neglect as a child or someone who just asks you that question. And the statistics really are phenomenal. The higher level of early life stress that you have, you have a dramatic increased risk of seven out of the top ten causes of death.

If you have just four of those categories that I mentioned, you have a 400% increase risk of things like developing depression or Alzheimer's. And the mental health issues that we see. If you have six of them, you have a 20 year reduction in life span. And that was based on huge studies by the CDC and Kaiser Permanente of 17,500 adults. And they started those studies in the mid-1990s. So, we know that it has a major impact.

So, it's this idea of developmental trauma. It’s very much to do with how we connect with ourselves. And how much self-love we have. How much we feel at home and connected to our self. And that is really the ability to have resilience and to have good self-care practices. We learned that through being mirrored by our key caregivers.

So, in adulthood, how you respond to stress, so you can be more primed if you've had a lot of early life stresses, you’re more likely to have a bigger stress reaction to smaller stresses in adulthood. And it's actually neurologically based because it's actually changed the neurology. And we're much more likely to not have resilience if we have had this early life experience.
There’s also interesting like personality traits as well. So, it’s very interesting early life stress. In adults when we have trauma, we have a state that develops, and a state is temporary. In childhood, the states become traits. And they become biological fate. So, it becomes much more programmed in. And we’re looking at traits like, and we’ve all got them to some degree, but things like that kind of constant overachieving or constant over giving.

So, you can also be over give is where we never prioritize our own needs. Things like, we know we’re kind of anxiety type or a perfectionist. And a lot of that is all making up for where we didn’t get this early sense of, basically it’s about love. It’s about unconditional self-love. And it’s not taught in sight. And I’d probably say that more than 80% of us, do not get taught that self-love. So, what we do is we make up for it.

So, if I don't feel at my core, okay. I'll make up for it by achieving and creating huge amount of external states that validates that I'm okay. Or if I just get everything right, I'll be okay. And it’s just what the message that we got from parent. If you've got overly criticized, we took it to our core existence, our identities that it was unacceptable. And that is where you do everything right, achieve, or give to everybody or worry about every single thing that happens.

And that's where the sabotage comes in. Because that’s where people don't stick to health programs and protocols because they find themselves just not being able to stick to it. It's like they are choosing consciously one thing and then their body does something else. And it's often this core unconscious, core traits, that are driving the behavior. And actually, what it comes down to is a self-love deficit from not getting enough love as children. And a lot of us got it.

So, you start identifying the patterns. That helps the awareness, that is half of it. So, you can resolve just by becoming aware of your traits, they can start to alchemize. And then when you are, it's this knack of learning. When you do see yourself sabotaging. Or you see these traits. Or you see things that may have gone wrong and you sense that's gone in your brain. Learning that you also need to have total self-acceptance, nonjudgmental self-love. That's where it starts.

It starts there. Because we can become judgmental about the fact, we notice that we were a judgmental person. And it's like, that is not breaking the spiral. Somewhere you have to start just saying, just being able to get that knack. So, that's some of the basics that people can do to just start to explore.

Dr. Brian Mowll: I've had many clients over the years who can trace their diabetes diagnosis to an event like this. Such as a divorce, a loss of a parent, spouse, or child, a prolonged illness, either personal or
of someone they care about, or a major job loss or change. Often, we never fully heal from these events. We bury them inside. Unfortunately, many times we still carry the burden of these past hurts and they take a lasting toll on our health.

**Sachin Patel:** So, here’s the thing with stress. The question is, “Okay, what are we eating?” The next question is, “What’s eating us?” So, that’s what stress is. It’s eats us up from the inside. So, despite what we eat, what we have to realize is what response are we actually creating in our body? So, I could, you know, put rocket fuel in your Ferrari, but if you get out of my driveway and you drive off in the wrong direction. What good is that, right?

So, a lot of people are eating healthy. But they're fueling a stress response instead of fueling a healing response. And you can't be in a state of stress and in a state of healing simultaneously. You're either in one or the other. So, you can use that nutrition to fuel a stress response. Or you can use that same nutrition to heal, regenerate, and replenish your body. But you can't do both.

And what most people want, is they want to heal, regenerate, repair, reproduce, all those things that they're coming to see us for. But they're putting their physiology in a stressed out state. And so, they get the exact opposite results.

For example, I've been sharing this with a few people and they're really fascinated by this information. And I was too, when I first heard it. At rest, 50% of our blood flow goes to our liver and our kidneys, 50%. And so, that's significant because when you're in fight or flight, only 5% of your blood goes to your liver and kidneys.

So, if somebody comes to me and they want to go on a detox protocol. Well it would be unethical for me to give them a bunch of supplements. And keep them in this constant fight or flight response because I'm not even sending blood to those organs to actually take advantage of the nutrition that I'm putting into that person's body. So, the only way to really fix this person is to get them parasympathetic first. You know, tweak their nervous system. So, it's not so triggered. And not so you know, overly responses to stress. So, that they can actually send blood to where they want to heal.

So, a key thing to remember is where you send flow is where you send function. So, if I want to increase the function of gut health, increase the function of my detoxification, my liver function, kidney function, I have to send blood to those organs to do that. Just like if I want to run away from something, if I'm in a fight or flight situation. I need to send blood to my arms and legs.
And that has to come from my trunk. So, I take it from here. I shunt it from my core. And I send it to my arms and legs. And now I've got this whole cascade of things that are taking place in my body because of the chemical signaling. And I've got to then take that fire that I've created, my emotions have potentially created, or my environment is created, and then I've got to put it out. And that's an exhausting process.

Imagine having to rebuild and then burning the house down. And then rebuild it, burning it down. And you just did that constantly over and over again. You're never really going to get any progress. So, one thing to remember for people is despite the fact that your cells are renewing constantly. You know, every three days our gut lining replaces itself. How cool is that?

So, the question you have to ask yourself is, why do people stay sick? And the reason they stay sick is the same reason that buying you a new car doesn't make you a better driver. We have to send the cells, these brand new cells, a new message. We have to send them a message of healing and repair. Not a message of what we call the cell danger response. Where the cell thinks it's going to be in a catabolic breakdown type of state. We need to send flow and function to that area. And we only do that if we're in a parasympathetic relaxed state.

Everything works better when we're in that state of our nervous system. Now, how we unpackage that is very unique for each person. For a lot of people, a big trigger for their chronic stress response is childhood trauma, unresolved trauma, or mistake in trauma. Things that they don't even know are problematic for them. Things that they may not at a conscious level be able to associate with.

But it's constantly triggering them. It could be a certain scent. It could be a certain voice. It could be a certain name. It could be the environment of their office, right? It could be their boss' voice. I mean, it could be so many things that are triggering them. But it's not the person or the event that's the problem, it's their past traumas that are being triggered. That is the problem. And so, that's what needs to be fixed.

And so, most people don't realize this, but our nervous system, is really understanding the world happens between the age of zero and eight. So, this is where our fears come from, where our belief system comes from, our value system it comes from. This is why as much as people try not to become their parents, they become their parents. Because their parents raised them and program them.

So, this is a software that people are constantly running in their heads. What should I be afraid of? Is the world a safe place? Is the world a scarce place or an abundance place? This value system that we carry around with us then determines what can trigger us and what doesn't
trigger us. And sometimes we don’t even know what those things are. So, for me, for example, when I was young, nothing was ever good enough for my parents, okay? And that was their way of showing me they loved me, was to push me harder and harder. In our culture, what I learned as I grew up, I was like, “Why are all these kids who are less accomplished academically than me, why are they getting all these gifts and being showered with all these praises? And we don’t get any of that?”

And it’s because my dad never got that. And his father probably never got that, right? So, we pass these things along from generation to generation. And these are traumas that some of us live through. And so, it can be a big problem.

And so, for some people, nothing’s ever good enough and that stresses them out. And they could be ultra-successful in life and from the outside appear very successful and they have it all together. But in their head, they’ve got this traumatized belief system that nothing’s ever good enough. So, they just keep pushing themselves, pushing themselves, pushing themselves, and that can deteriorate their health too.

Dr. Brian Mowll: Finally, we need to consider physiological stressors. Such as chronic pain, inflammation, injury, acute or chronic infection, dental problems, sleep problems, gut issues such as dysbiosis and leaky gut syndrome, food sensitivities, hormone imbalances, and others. Even with this simple list, you can start to put together a more complete picture of the myriad sources of stress and how they can infiltrate your life.

Dr. Robert Silverman: The center of your universe is you’ve got health. 80% of your immune cells are in your gut. It’s where your macro, your foods. And your micronutrients, your vitamins and minerals are absorbed. We’ve seen multiple studies that have shown when you have any kind of excessive permeability to your gut, you have an increase in blood sugar dysregulation, prediabetes, diabetes, and the like. So, it’s a fascinating thing to see that the center of your health universe is without question your gut.

Let’s define what a leaky gut is. Your gut is supposed to be semipermeable. There is supposed to be a little osmosis and things transferring through. But a permeable gut, lets proteins, microbes, viruses go through. When that happens, your body’s immune system goes on alert. And it starts to actually attack these things because your body looks at these things as foreign because it’s not something that it is used to assessing. So, it attacks it.

So, it starts an inflammatory cascade or an autoimmune cascade throughout your body. Diabetes is a byproduct of autoimmunity.
Most issues, most conditions, most syndromes are byproducts of autoimmunity. So, by having a leaky gut, you’re leading yourself down a path to autoimmunity and one of these things are the prediabetes and the diabetes.

So, the real question is how do I avoid these gut issues? Well, something called dysbiosis. Dysbiosis means in a leveling of good and bad bacteria. But what’s shocking about good and bad bacteria is you need about 85% good bacteria to bad bacteria to not be in dysbiosis.

So, when you have dysbiosis, you have signaling issues. Too much bad bacteria to good bacteria. These signaling issues, again, signal inflammatory signals. And believe it or not, they do sell through what we call our nervous system, our enteric nervous system. And that is why that enteric nervous system is led by the vagus nerve. And that is why they say the gut is the second brain.

So, we want that balance between good and bad bacteria. The problem is it’s not like a seesaw where it's 50/50 or 51/49, you win. That 85 to 15 is a really stout number. So, you’re always working on getting that good bacteria.

People are funny. They come in and they have some blood sugar issues. And of course, we always want to change our diet. We always want to change their lifestyle. But we’ve got to fix their gut microbiota. There are studies that show when the gut microbiota is inappropriate or like we said with dysbiosis. That inflammation in the gastrointestinal cells are increasing, they are the hallmark for type 2 diabetes.

Dr. Brian Mowll: I recommend taking a self-inventory of your potential stressors. Start with a blank piece of paper and fold it lengthwise. On the left side of the paper, write down all of your potential stressors. Start with your daily life stressors. Such as work, stress, kids, deadlines, meetings, marital or relationship struggles, and so on. Then record any major life events that have had a substantial impact on you. Such as loss of a loved one, personal illness, divorce, or other events. Lastly, check in your body. And write down any other known that could trigger a stress response. Such as chronic pain, allergies, gut problems, and hormone imbalances.

Kirk Parsley, MD: So, sleep is one of the, you know, we’re at this Paleo Conference and you have everything that anyone’s arguing for right now. There’s 10,000 people arguing the opposite. Sleep has never been that way. All the sleep research is exactly the same for the past 50 years. It’s not a very old science, right? It began by William Dement about 50 years ago. But it all shows the same thing.

And what it shows is that if you short sleep and which is defined as two
hours less than you need, approximately six hours. Well, two hours less than you need is approximately six hours. You need approximately eight hours. If you short sleep, you decrease insulin sensitivity by 30%. You decrease testosterone by 30%. You decreased growth hormone by 30%. You increase inflammation. You increase ghrelin. You decrease leptin.

So, everything to set you up to, one, not have good insulin sensitivity. Two, also, you'll be craving a lot of bad foods because you are metabolically imbalance. Three, your prefrontal cortex is shot, right? Because that part of our brain is what makes us smart, which makes us human, which gives us our discipline, willpower and a structure to our life. And be able to make a decision, an intelligent decision, and act in a way that's appropriate for what we want.

You know, it's the one thing that we do that's critical for our health, that we don't actually have any awareness of. You know what you ate. You remember your exercise. You remember how you feel when you exercise. You know, if you feel good or bad. You go to sleep, if you actually go to sleep, you don't really know what happens. You just know that one minute you're awake and then another minute you're waking up. And that everything in between is usually kind of absence. So, you don't really know. So, without a conscious awareness of it, it's really hard to motivate people to do it.

And the other thing has been shown over and over again is that they like to compare the impairment of sleep deprivation to various things. And alcohol is a good one. Because everybody knows how people behave when they drink a little, right? So, they do like driving tests and so forth. And a sleep deprived person versus somebody who has a blood alcohol level of say 0.5 or 0.8 or whatever kind of level they test it at...And what it turns out is if you sleep six hours a night on average, you perform as though you're drunk. You perform at the legal limit of alcohol or right around there. So, you are around 0.8 if you sleep six hours on average.

But the interesting thing is when you get somebody to sleep really well for a while. And so now they're coming in with a strong base of sleep. And then you start depriving them of sleep. And then you test them the next day on anything. It doesn't matter. Strength, endurance, cognitive learning, doesn't matter. Test them on anything. And they'll do worse than the day before. And they know it. They'll say, “Yeah, I did worse. I was tired.” Do it again, they'll say the same thing. Do it again, they will say the same thing.

By day four, everybody's like, “I'm totally adjusted. I feel fine.” So, it's a lot like alcohol in that respect too, right? Because one beer, you're like, “One beer, I can drive home.” Two beers, you're like, “I better wait a while.” Three beers later, you are like, “Hmmm.” But by four beers, you are like, “I'm fine.” That's what you think, right? And hopefully you have good
friends around saying, “No, you are not.”

But you lose that self-awareness. You’re not conscious of the process, that’s so healthy. It’s like the most important thing for your health is sleep. It’s the only time you’re getting better at anything. It’s the only time your body’s repairing. It’s when all of your anabolic activities going on. It’s where you are learning everything that you thought you learned during the day. That’s all getting consolidated at night.

The most important part, we don't know if we did it or not well because we're not really aware of it. And if you start taking it away from us, we just adapt, and we feel normal. And it's like diabetes or something. Once you start correcting their metabolic dysregulation, they go, “Man, I don't remember feeling this good before.” Because it was such an insidious process. They never caught onto the fact that they were getting worse, worse, and worse. And sleep deprivation is exactly the same way.

Dr. Brian Mowll: On the right side of the page, you'll want to write down the strategies that you are going to be using to help your body to distress or to alleviate stress. Such as breathwork, yoga, meditation, or prayer. I’m going to cover these in more detail in just a few minutes.

In addition to these stressors dealing with diabetes and chronic blood sugar problems is a stress in and of itself. And has been associated with depression, anxiety, and distress.

In fact, according to the AADE, “Those living with diabetes are two to three times more likely to be depressed than those without diabetes. While those with depression are at a greater risk for the development of type 2 diabetes.” A 2003 study published in Diabetes Care, concluded that, “Diabetes was associated with an increased likelihood of anxiety disorders.”

And another from 2000 found that, “Depression is associated with hyperglycemia in patients with type 1 or type 2 diabetes.” The 2003 paper went on to make a recommendation. They said, “The association between mental disorders, diabetes, and glycemic control, should be evaluated carefully.”

One of the ways that we evaluate distress related to diabetes is called the Diabetes Distress Scale. According to the AADE, “Whenever our actions have unpredictable outcomes, we can become distressed.” In this case, it's specific to diabetes. So, it's referred to as diabetes distress. We develop tension, fatigue, a sense of being overwhelmed, and experience burnout. This burnout sometimes pushes us to quit. Or at least not pay close attention to the things that are causing this distress.

They recommend some steps to avoid diabetes burnout and ease
distress. These include, find someone who understands your feelings and surroundings, who our living with diabetes, and talk to them. Talk with another person who has diabetes. A diabetes support group offered by your local hospital or your diabetes educator, family member, or a mental health professional. If you feel judged by others, express your concern and find a way to ask for their help rather than their judgment.

The medical system can sometimes make you feel that if your health is not improving. Then it's something that you're doing wrong. You need their support. Which is different than their judgment. Not included in this list is what I found to be the most important advice. That is to choose and follow a plan that empowers you and helps you to maintain optimal control of your blood sugar. When you're eating a haphazard diet, have an inconsistent exercise routine, and aren't following the right steps to improve your sleep or manage your stress. Your blood sugar will fluctuate widely. And this leads to frustration and distress.

The clients that I've worked with who tend to avoid diabetes burnout and distress, are the ones who are the most in control of their diet, lifestyle, stress management, and blood sugar levels. It's also essential to note, that if you're dealing with depression, anxiety, or severe distress, it may be important to seek the help of a mental health professional.

Here are a few signs that you may need to see a mental health practitioner. First, the feelings that you're having are interfering with your life. You feel disconnected from people or things that you once loved. Friends or coworkers have told you that they're concerned about you. The feelings that you're having are intense. Your relationships at work or at home are strained. Or you avoid social situations altogether.

Christa Orecchio: If you're living in sympathetic dominance, you're going to experience anxiety. You're going to wake up between one and four a.m. You can’t be a good sleeper if you're having adrenal and thyroid problems. You'll wake up earlier than you want, five in the morning, maybe when your alarm is set for 6:30, with your heart pounding. You are not going to have an appetite because stress hormones are the greatest appetite suppressor in the world. And so, when you wake up and you’re not hungry in the morning, like lot of people in this state aren't even hungry until say 11:00 a.m. And they'd rather have a cup of coffee or nothing and just kind of shoulder on.

And it's almost like they could be nauseous at the idea of eating. And so, it's like this crazy whirlpool. And what we have to do is we have to intercept the Whirlpool by using food. Just food as your medicine eating metabolic proteins. Which are proteins that are very easy for the body to digest. And always eating protein, carb, and fat together. Never eating one macronutrient by itself. Those are some really important strategies.
When we talk about adrenal fatigue, like does that even exist? It's really a problem at the cellular level. Between the thyroid, the adrenals, the digestive system, and the nervous system. So, what we have to do is make sure that we can shuttle glucose, thyroid, hormone, and oxygen into the cell. So, that we can stoke the fire and give the body something to create energy from once again. And this is when we stop over secreting stress hormones. And we can start burning the nutrition in our food so that we can have energy. And start to sleep and feel calm. All those good things.

**Dr. Brian Mowll:** So, we've talked about the effects and the sources of stress. Let's move on and discuss what to do about it. Several studies have shown that good stress management can lead to measurable reductions in hemoglobin A1C levels.

For example, a report in *Diabetes Research in Clinical Practice*, saw a 3% point drop in A1C with stress management training. That's better than three different diabetes medications combined. And a 2002 study in *Diabetes Care* concluded, “That a cost effective group stress management program in a real world setting can result in clinically significant benefits for patients with type 2 diabetes.”

There are several stress management techniques which I found to be helpful working with clients over the past 20 years. The first one is called mindfulness. Mindfulness is a state of being. It's paying attention to life. Paying attention to your state, to your awareness, your mental attitude, the foods that you are eating, choosing to eat and not choosing, out of some sort of physical whim or craving. But choosing your foods mindfully, choosing the people that you're interacting with and being aware of how these physical interactions are affecting your physiological state. That is mindfulness.

You want to pay attention to your body and make helpful, empowering decisions, and that starts with being mindful. The more mindfulness you can bring to every interaction, every meal, and every situation, the more self-control you'll have. And the better decisions you'll tend to make. Mindfulness grounds you to the now. So, you can't be upset about the past or worried about the future, when you're anchored in the now.

The next technique, which is a little bit more practical, is called breathwork. And breathwork begins with watching and paying attention to your breathing. Again, we'll go back to mindfulness. Being aware of your breath. And then we want to try to improve the way we breathe to improve our physiology. By consciously controlling your breath, you can influence the autonomic nervous system. And in turn affect heart rate, digestion, body temperature, and other important factors.

There are several different breath techniques that I teach my clients. The
first is deep diaphragmatic breathing. So, this is using your diaphragm for what it's supposed to be used for. Which is to compress your abdomen and allow your lungs to expand. To have a full deep breath. Place your hands over your belly as you breathe in. One hand on top of the other. And breathe in through the nose and out through the mouth. As you breathe in, feel your stomach expand, and push outward. As you breathe out, feel your stomach sink back down. You can do this for a count of five in and five out. With eyes open or closed as you relax and let go.

The second breathwork technique I'll discuss is called box breathing. Box breathing is similar to diaphragmatic breathing except for we're doing a specific counting method. So, we'll breathe in through the nose for a count of four. We'll hold that for a count of four. We'll breathe out through the mouth for a count of four. And then we'll hold that for a count of four. That's oftentimes the most difficult part. And as you do that, you continue to focus on improving your breath, deepening your breath, relaxing your body, and you tap into that restorative part of your nervous system which increases healing and reduces that stress response. And reduces your blood sugar.

Sachin Patel: One of the things that we have people do is use heart rate variability. So, heart rate variability for anyone who doesn't know is basically measuring the amount of time between each heartbeat has a slight variance to it. So, when we're in a fight or flight type of state, the heart rate variability is actually very low. So, the timing between each beat is actually very consistent. When we're in a relaxed state, the timing between each beat, there is a little bit variance. And that variance tells us if somebody has a high heart rate variability, that's a good thing. Or if somebody has a low heart rate variability, which then tells us they're in a stress dominant response. So, what we can do, the override of the stress response is our breathing apparatus, right? So, by stimulating our vagus nerve, which is cranial nerve number ten, we essentially tell the nervous system to go into a forced relaxed state, okay? So, we can use breath to override this system.

This is why every ancient form of medicine uses breath. So Tai Chi, yoga, Qigong, meditation, they all use breath as the intervention. Maybe they didn’t know why it worked or how it worked. But we know now anatomically, the vagus nerve basically innervates all of these organs. And it’s responsible for that communication between the brain and the rest of the body.

So, when we go into a stress response, we turn off the vagus nerve. One way to turn on the vagus nerve is through deep breathing. And that overrides that stress response. This is why when people are getting anxious, they have them breathe into a paper bag. I don’t know if that’s
the approved methodology. But basically, you control your breathing.

That's what Wim Hoff technique is, is to learn how to control your breathing. You know, under extreme circumstances to build resilience. And that's what all the deep breathing methodologies are as well. Is to get that parasympathetic nervous system to activate.

**Dr. Brian Mowll:** The next technique I'd like to mention is meditation. Meditation has a long track record of being wonderful for healing and restoration. There's research showing that it can improve blood sugar and prevent diabetes. As well as lowering high blood pressure and heart rate. So, meditation is a wonderful healing technique, restorative technique, and stress balancing technique. I highly encourage you to consider practicing meditation.

There are many different forms of meditation. And it doesn’t have to be complex or complicated. It certainly does not need to be religious in any way or even spiritual. Although you can choose to use it as a spiritual technique if you like. But meditation is really just about letting your mind go.

So, the easiest way that I found to meditate is using something called mindfulness meditation. And that's just simply, finding somewhere comfortable to sit and just fold your hands comfortably across your lap. You can sit against a wall. You can sit on a pillow. You can sit on a chair, if you'd like. But I think it's best to be grounded on the floor if possible. Sit and rest your hands on your lap. Close your eyes. Then just start to breathe. Watch your breath come in and out.

And let your thoughts go. Imagine sinking deeper and deeper with each breath. It’s really that simple. There is no perfect meditation. It’s the intention and the act of doing it that carries the benefits. And meditation will help to balance your stress response. It’ll help to lower your blood sugar. And it will help to improve your physiology if you do it. And if you do it on a regular basis.

**Anna Cabeca, DO:** I teach people to follow the Keto Green Way. And so, by this we get the ketosis component from intermittent fasting and more healthy fats, like a ketogenic component to our diets that's nutritionally sound. And that creates insulin sensitivity, right? So, with that ketosis getting our body into this fat burning stage producing ketones. We’re going to become more insulin sensitive. But it’s only like, you know, it's less than half about what we eat.

The other part is how we live. Cortisol, we know, that the more alkaline vegetables and alkaline foods that we have, that can affect our cortisol. That can help improve and decrease cortisol. Also, we know that meditation, getting out in nature, getting a good night’s sleep, all can
decrease cortisol. And then, also, I have clients measure their urinary pH. So, those behaviors also increase our urinary pH. So, by looking at and actually testing urine pH, it's a marker, just like the weight on the scale, right? It tells you a little bit about how your body is interacting with the environment.

And so, that gives you a guideline. “Okay, well I’m eating great. And I’m stressed. And my urinary pH is acidic. But I’m eating the same stuff. And I had fun with my friends. And I’m alkaline.” That’s important because we need to control cortisol. We need to control it so that we get good night’s sleep and that we can restore oxytocin. And put oxytocin back up where it belongs as the center focus, crowning gem of our lives.

So, by enjoying things that we love, by laughter, by sexual health, and sexual intimacy, hugging, kissing, playing, having a pet, all of those things increase oxytocin. And getting out in nature too. Just being able to be at peace, mediation, prayer can increase oxytocin as well.

Dr. Brian Mowll: The next technique for those who are either spiritual or religious, is prayer. And prayer is very different than meditation. It’s not just about sitting. It’s a communication with God. Whatever that means to you. Prayer can be extremely helpful. It allows you to turn over your burdens to God or that higher power. Prayer can be very helpful to change your perspective in life. When you start praying for others and praying prayers of gratitude, it helps put life in a perspective. And maybe your troubles and worries get just a little bit smaller.

The next technique I’ll mention is called visualization. And visualization is again very different than prayer. It’s different than meditation. Visualization is using your mind to paint a picture of life the way you typically want it to be. So, we can paint a picture of life without diabetes.

Life with normal blood sugar. Life at your goal weight, whatever that may be. You can use visualization to paint that mental image so clearly that it can become reality for you. I like to use guided visualization. There are many visualizations for diabetes and other common problems that you can find right on YouTube. I recommend using visualization as a tool to help relax your mind. Relax your body. Balance your stress and physiology. And improve your blood sugar.

The next technique I’ll mention is called the healing bath. A healing bath contains hot water, Epson salts, and typically some essential oils. One of the most common oils that a lot of people use in their healing bath is lavender. Lavender is known to be very relaxing. I also like Roman chamomile oil. Vetiver, which is very grounding and relaxing. Frankincense oil, which can be very healing to the skin. And myrrh oil is also a very good choice.
The best way to handle stress is to understand it and to understand the underlying mechanisms. Then address it manually with the right stress management approach.

**Marcelle Pick, NP:** You know the bottom line is we need to personalize it for people. What works for you may not work with somebody else. So, it's finding out where in this arena do you feel more rested. I'm a dancer. So, I do ball room dancing a lot. And that's my go to. Because it helps me meditate. And also gives me exercise. But somebody else might like yoga. Somebody else like meditation. So, you have to find out for yourself what speaks to your soul. So, that you do it on a regular basis. That's the key.

**Dr. Brian Mowll:** In my next module, I'll be discussing medications, supplements, and nutrients for diabetes and blood sugar. I'll break down the pros and cons of each medication. And share what the evidence says about supplements for blood sugar health.

Until then, this is Dr. Brian Mowll, the diabetes coach. And I'll see you back soon for Module Seven.
Dr. Mowll: Hello, and welcome to Module 7: diabetes medication, nutrients and supplements, understanding the biochemistry of diabetes and blood sugar management. When I interview a potential new client for my premier blood sugar coaching program, we always discuss goals and desires, what outcomes the person would like to achieve by working with me and my team.

Second only to normalizing blood sugar levels or hemoglobin A1c, the number one goal that almost every potential new client has, is to reduce or eliminate medications. Maybe that’s one of your goals, as well. This comes as a surprise to most doctors and practitioners in conventional diabetes management.

When I go to diabetes conferences, there are always a number of lectures given on how to improve medication compliance, how to help patients understand why they need to take their drugs. And it makes sense to a certain point because it’s not safe to have high blood sugar levels. If patients are forgetting or purposely missing medications irresponsibly and doing nothing else to control their blood sugar, they’re headed down a very dangerous road. There are a few key problems though, with this type of approach.

I’m Dr. Brian Mowll, the diabetes coach, certified and master licensed diabetes educator and IFM certified functional medicine practitioner. And in Module 7, I’ll explain the pros and cons to various diabetes
medications. And take a hard look at the evidence base for nutritional and botanical supplements to help improve blood sugar and conquer diabetes.

**Dr. Westman:** So the mainstream systems in place with the treatment of diabetes and other health problems for basically the use of medications, I kind of see today's medical world as a medication treatment system. And you know LCHF or keto is disruptive, it means you change the food which we're not taught about in medical school. And actually then you take away medications. So it actually goes against what most doctors have been taught today. And that's why we're working on programs that are outside the main medical system because we just can't wait for more people to know about this.

**Dr. Mowll:** The first problem with relying on medications alone is that they don't actually lower blood sugar by all that much as you'll learn in this module. According to Erica Gibal, PhD, writing in *Diabetes Forecast*; diabetes medications lower A1c score on average between 0.5 and 1.5%. That's not great. The second problem is that diabetes medications don't really address the root cause of type two diabetes.

Different medications, of course, have different mechanisms of action. They work in different ways, but none of them make it significant impact on the causes of diabetes, they mostly just lower blood sugar while the disease rages on under the surface. Next, all medications have side effects or adverse effects, and diabetes medications are no exception.

The side effects, in some cases, can be very serious, including hypoglycemic shock, infection, kidney damage, cancer, ketoacidosis, thyroid disease, dehydration, muscle nerve damage, and pancreatitis. You should work together with your physician to evaluate the risks of adverse effects with the benefits of the intended effect. I'll cover the risks and benefits in more detail later in this module.

Lastly, we have to weigh the costs of the medication on both the consumer, that's you and me, and on our health care system. Some diabetes drugs can cost well over $500 per month, and someone has to pay that bill. Now, if the drug is necessary, or the only option like in the case of insulin for someone with type one diabetes, then the benefits clearly outweigh the costs. But for other drugs, this question is still certainly up for debate.

**James:** So diabetes is a great example, type two diabetes specifically, where the cause of the disease is not being matched by the protocol for the disease. So if you have a disease that's mainly born of lifestyle, there has to be a lifestyle solution to have a long term fix, a long term solution; a sustainable solution that doesn't require 20-30 years life or even lifetime use of medication. You know, when you do use medication over
extended periods of times, the result is unpredictable because none of the drugs are tested for that amount of time.

So one pathology becomes another pathology and suddenly you have 10 diagnoses. So you know, type two diabetes is growing quickly because of the real rapid change in lifestyle. But the medical system has not adapted to be able to provide solutions that fit the condition itself, it's really like the condition is being treated as though it was like an acute disease like an infection or trauma.

And so we have to adapt the systems to reflect the cause of the issue. And to be able to ultimately get to the only logical endpoint, which is complete reversal. When you're not on medication, you're just living a healthy life controlling your own blood sugar with your own natural processes. And that's the goal that we're aiming for. The kind of good news/bad news is that something has to change, because we're running out of money. And putting people on drugs for extended period of their lives is leading to unsustainable costs.

So in different countries, I think it's going to work out differently depending on how the medical system is set up. So in the UK, we're really starting to see. There's doctors there; Dr. Unwin is there, Dr Aseem Malhotra has been going crazy talking about, like -- we have to have a fundamental shift in how we're teaching people to eat, and the diabetes groups and all those kind of things because he's passionate about the transformation.

So there has to be more systemic change there, because the government is running everything whereas here, there's more opportunity for innovation, because it's kind of a market based system in a certain way. So we're starting to see shoots -- I think, if you look at the macrocosm in medicine, payments are shifting from like fee for service to fee for value.

So you're going to get paid not for doing stuff, but the keeping people healthy. And so when those incentives shift, we'll start to see more and more innovation happening. And so I'm excited to see the macrocosm, you know the rules are changing. And that will incentivize the creation of exactly what we're talking about.

Dr. Mowll: With all that said, I still believe that in many cases, diabetes medications can be helpful. And if effective short term tools, and in some cases may be necessary long term to maintain optimal blood sugar control. Medications are not the enemy, but we need to use them in an intelligent way and as part of a much larger array of potential treatment options.

Dr. Scher: If you need to take a step. Here is a medication that is
supposed to lower your cardiovascular risk, and some people clearly does lower their cardiovascular risk. Yet at the same time, it can increase one of the biggest risk factors for heart disease, which is diabetes. How do you balance that, and it's a confusing concept.

So the literature suggests that it can accelerate the onset of diabetes in people who are already at risk for that, particularly in women. The percentages are sort of all over the map in terms of how often it happens; some will say is one in 10,000, some will say is one in 10. It depends on the literature, and it depends on the person's baseline risk. But it's clear there is an increased association with diabetes. So from my perspective, if astatin is indicated for secondary prevention, for high risk primary prevention, and it makes sense in your overall health perspective, your overall health picture, and you need to take a standard.

I think standard of care should be using a low carb diet with statin, so you're doing everything possible to decrease that incidence of diabetes or that insulin resistance that comes along with the Statin medication. Certainly, if you're on a statin, you don't just follow your lipid profile; you need to pay more attention to your A1c, probably your fasting insulin to markers of insulin resistance, because if you see that changing, then you need to reevaluate the risk benefit ratio of taking that statin because everything is a balance of risk versus benefit.

And if you see that you're getting worsening insulin resistance or margin towards diabetes on that statin all of a sudden that risk benefit ratio scale is tipping. So definitely something we need to be aware of, I think something we can treat and hopefully prevent with low carb lifestyle.

**Dr. Mowll:** Many people looking for a more natural, safer alternative will turn to the internet, the health food store and nutritional supplements. While I'm all for personal health empowerment, doing yourself diabetes care can lead to frustration and is typically ineffective, confusing, and in some cases dangerous. There are too many unproven products on the market, claiming miracle cures with little oversight and poor evidence. However, that does not mean that nutrients and botanical formulas cannot be useful for people with diabetes or blood sugar problems. In fact, there are thousands of peer reviewed published research articles demonstrating positive benefits from various herbs, nutrients, super foods, flavonoids, fatty acids and other botanical compounds.

In this module, my goal is to help you separate fact from fiction and get a better understanding of what works and what doesn't according to the published research and scientific evidence.

**Dr. Wolfson:** Unfortunately, where we are right now in society is that the medical doctors think that we're deficient in these pharmaceuticals.
They think that coronary artery disease is a statin drug deficiency, and it just kind of how we're trained and where our mindset is right now. But if we continue to trace it back, and we can see that eating the right diet will lead to the best lipids, cholesterol, and LDL, and HDL and triglycerides, even the best diet will also lead to the best blood sugars.

**Dr. Mowll:** Let's start by analyzing and assessing the currently available diabetes medications. This is always changing, and there are over 100 approved formulations for diabetes and related cardio metabolic disorders. So I'll do my best to cover the most common classes of drugs here. First, let's talk about Metformin, generic for glucophage and glumetza.

Metformin is considered by most doctors, clinicians and diabetes organizations as the primary drug of choice for type two diabetes, and is being prescribed more commonly for related metabolic conditions like PCOS and pre diabetes, as well. The main mechanism of action for Metformin is to slow the release of glucose from the liver by suppressing something called Gluconeogenesis. That’s the new production of sugar in the liver.

Insulin does this, as well, through a different pathway. But when your liver is resistant to insulin, it releases too much glucose, especially in the morning. Metformin blocks this, it also slows glucose absorption in the gut, improves insulin sensitivity and improves cellular glucose uptake. While that all sounds very helpful, and in fact is for a large number of people, there are some common problems with the drug Metformin.

First, Metformin can cause, sometimes, fatal condition called Lacticacidosis, and should not be used by anyone with type one diabetes, kidney problems, liver problems, COPD, or those with a history of alcoholism. The most common side effect of Metformin is gastrointestinal distress. This can include nausea, diarrhea, abdominal bloating, cramping, heartburn and gas, and in some cases can be quite severe.

About 25% of the people who take Metformin will get these symptoms, but in some cases, they'll fade over time with continued use. Metformin is also known to deplete vitamin B12 and folic, which can elevate levels of homocysteine leading to inflammation and increased risk for cardiovascular disease. So if you decide to take Metformin, it's essential to have your B12 and folate levels tested regularly.

Overall, Metformin is a good drug. It's cheap, and it's effective with minimal side effects for most people, and can be used short or long term to help you optimize your blood sugar control. It's important to note that the full effect of Metformin can take three weeks, so transition on or off the medication can take some time.
The next class of drugs is called Sulfonylureas, and these are one of the oldest types of diabetes medications. They’re currently being phased out for most diabetic populations. These are often called Insulin secretagogues, because they force your pancreas to release more insulin. The brand names include Glipizide, Glyburide and Glimepiride. Other secretagogues include Prandin and Starlix, which work in a slightly different way. The reason these drugs are being phased out by most physicians is that they’re notorious for calling dangerous low blood sugar episodes called hypoglycemia, and also cause waking. Most people with pre and type two diabetes need to lose weight not gain weight. These drugs have also been linked to development of coronary artery disease and cardiac events and are believed to cause pancreatic burnout, leading to reduction in the ability of the pancreas to adequately produce insulin.

The third type of diabetes drug that I’ll mention is Thiazolidinediones drugs or TZDs. These include Actos and Avandia. These are the only drugs shown to have a substantial impact on insulin resistance and were once considered the most effective oral diabetes medications. Unfortunately, there were also found to cause life threatening side effects and given a black box warning about potentially causing or worsening congestive heart failure. They also cause significant weight gain due to increase fluid retention, and the stimulation of new fat cell production primarily on the thighs and buttocks. Other side effects include macular edema, leading to blindness, liver toxicity, osteoporosis and increased fracture risk, as well as bladder cancer. For obvious reasons, these drugs have fallen out of favor and are seldom used.

Next let’s talk about the Incretin medications. These include the injectable GLP-1 Agonists called Byetta, Bydureon, Victoza and Trulicity and the oral drugs known as DPP-4 inhibitors such as Januvia, Tradjenta and Onglyza. GLP-1 is a gut hormone called Incretin. It’s released when you eat and has several important effects including delaying stomach emptying, increasing insulin release, suppressing glucagon, which raises blood sugar, stimulating disposal of glucose and turning off hunger signals in the brain.

So the injectable GLP-1 Agonist confers similar benefits. The DPP-4 inhibitor medications work in a different way. These block the action of the enzyme DPP-4 that breaks down GLP-1. The end result is higher levels of naturally produced GLP-1, which has a similar but less potent effect to the GLP-1 Agonists drugs.

Many doctors prescribe these medications more for their appetite suppressing and weight loss benefits, then for their modest blood sugar lowering effects, as they typically only reduce hemoglobin A1c
by one half to 1%. These are all wonderful benefits and you can see why researchers were excited about developing these drugs. Like other diabetes medications, though, there are some potential problems and reasons for concern.

First, like the glitazones, the GLP-1 agonist drugs carry a black box warning from the FDA in this case, because they were found to cause thyroid cancer in animal studies. In addition, multiple studies found that both GLP-1 drugs like Byetta and DPP-4 inhibitors like Januvia may cause pancreatitis, which can lead to destruction of the pancreas cells.

In addition, a comprehensive study from the UCLA Medical School found troubling pancreatic tumors on many patients taking these Incretins, so they easily can be missed until the pancreas starts to shut down. Lastly, post marketing research on Victoza released by the manufacturer reported acute kidney failure and aggravation of chronic kidney failure leading to dialysis in some people taking the drug. The newest class of diabetes drugs in current use is a type of medication called SGLT-2 inhibitors. These are called Gliflozins, and the trade names include Invokana, Farxiga and Jardiance.

These medications block the reabsorption of glucose in the kidneys, causing you to dump more sugar into the bladder and excrete it in your urine. Essentially, they'll clip the peaks in elevated blood sugar by lowering what's called the renal threshold. There are many reported benefits to these drugs including reducing high blood sugar, weight loss, blood pressure reduction and cardiovascular benefits.

Side effects include increased risk of urinary tract and urogenital infections, urinary frequency, dehydration and mineral deficiency, which can sometimes be severe. They can also raise the bad LDL cholesterol levels, which may be a problem for some people. There were concerns about bladder cancer during FDA approval, and they carry a risk for dangerous ketoacidosis.

Lastly, let's address the different types of insulin. In Module One, I discussed different types of diabetes and how people with type one diabetes cannot produce insulin. So they are insulin dependent. And how people with type two diabetes typically make plenty of insulin, but don't respond to it effectively due to insulin resistance.

If it's true that most people with type two diabetes already make normal and many times elevated levels of insulin, why would a doctor recommend or prescribe that they take more insulin? This is a point of great controversy. But the simple answer is this; because the oral diabetes medications have a minimal blood sugar lowering effect. If someone has very high blood sugar and A1c and is not willing or able to get it down with diet, lifestyle and oral medications and supplements,
insulin is really the only option.

If you inject enough insulin to overcome the resistance, which in some cases is very large amounts, you will eventually get the blood sugar to come down. But there is a price, high blood insulin levels called hyperinsulinemia, which is often found in those with type two and pre diabetes, and especially in those type two diabetics using insulin can cause a number of serious problems.

One study showed that as insulin levels increased in the blood above normal, so did blood pressure, weight, BMI, cholesterol, triglycerides, LDL, plaque causing lipids and inflammatory markers. Elevated insulin has been shown to cause atherogenesis plaques in the arteries, increased risk for heart attack and stroke. It's implicated in Alzheimer's disease and may lead to more rapid growth of tumor cells, cancer cells.

Insulin use itself has a few side effects including weight gain, cancer cell growth, and potentially dangerous hypoglycemia or low blood sugar. There are reasons to want to avoid insulin for someone with type two diabetes. Unfortunately, some of the most common fears about insulin are unfounded. The needles, for example, are small and painless. It lowers blood sugar, and it's not a life sentence.

I've seen many patients able to discontinue insulin even after using it for many years, once they made the appropriate diet and lifestyle changes. If you need to use insulin to get your blood sugar down from a dangerous range, or to get it closer to normal to help preserve pancreatic function and reduce risks of high blood sugar, then make sure you use it properly. And use an optimal diet to minimize your insulin requirements.

Dr. Hallberg: I consider myself a specialist in nutrition and in diabetes. But really what I'm specialist in is, I'm adeprescribing specialist, right. So we're not taught about that in medical school, all you're taught about is how to prescribe medications. But really what we do is we take people off of them. So deprescribing is a joy from a physician standpoint.

And of course, we know it's a joy to the receivers who are the patients who then get off their medications. And so when a patient puts in blood sugar, if their blood sugar has dropped from the day before, even maybe the meal before, we come in right away, especially if they're on medication such as insulin or sulfonylurea that we know can drop the blood sugar too low. We have to be vigilant, ever vigilant with people until they get off of those medications. So when the blood sugar's go in, we react. And like I said, being able to react in that almost real time, allows the safe and effective reduction of those medications.

Dr. Mowll: Normal blood sugar should be your primary goal, no
matter what it takes to get there. The main reason I'm spending the
time to explain these medications, how they work, and the benefits
and side effects, is that I want you to be able to have an intelligent
conversation with your prescribing physician. It would be unwise and
not recommended to stop or change a medication without discussing it
with your doctor.

You should work with your prescribing physician using all of the diet
and lifestyle information you're learning here, and the medications as
short or long term tools to help you achieve optimal blood sugar control.
If you have a goal to reduce or eliminate a medication, share that with
your doctor and your healthcare team and include them in creating a
strategy to help you realistically reach your ultimate goals.

As I mentioned earlier, a quick Google search will produce hundreds
of nutritional products without rages in unproven claims. There are
however, some effective natural compounds that do have evidence
for use with blood sugar problems and diabetes. There are numerous
studies demonstrating the importance of optimal chromium levels for
blood sugar and diabetes.

In cases of chromium deficiency which is common in people with type
two diabetes and can be found on a micro nutrient test. Several studies
indicate that supplementation has a greatly beneficial effect on blood
sugar levels. Chromium is said to modulate blood sugar, reduce insulin
resistance, lower hemoglobin A1c, aid weight loss and inhibit glycation;
the damage from elevated blood sugar.

A paper published in the ADA's diabetes care states, “Growing evidence
suggests that chromium supplementation, particularly at higher doses
and in the form of chromium per colony, may improve insulin sensitivity
and glucose metabolism in patients with glucose intolerance, and
type one, two, gestational, and steroids induce diabetes and in some
individuals without diabetes.” Doses used in studies range from 100 to
1000 micrograms of chromium.

One review of literature reported, “A more consistent clinical response
is observed with daily supplementation of chromium greater than
200 micrograms a day for duration of at least two months.” Another
important micronutrient is biotin; biotin can improve metabolism,
reduce blood sugar, and may be beneficial in diabetic neuropathy.

Biotin works with insulin at the cellular level to increase glucokinase,
which improves glucose utilization. For it to be effective, biotin is often
combined with chromium, and the dose needs to be high enough
to elicit a response, typically two to 16 milligrams a day according to
research. Here's what one paper said, “It is therefore reasonable to
predict that the joint administration of biotin and chromium per colony
in doses that are super nutritional, but safe and well tolerated will benefit virtually every aspect of the type two diabetic syndrome.”

Several studies have shown that a significant percentage of people diagnosed with type two and pre diabetes have low levels of vitamin D. According to scientists, vitamin D improves insulin sensitivity, may be involved in insulin production in the pancreas, acts on certain genes to reduce inflammation and modulates PPAR, a key factor in insulin resistance.

Results from various studies have mixed results. Several studies show no improvement with vitamin D supplementation, while others show improvement in hemoglobin A1c, CRP, lipids and insulin sensitivity. Meredith Hawkins, MD from the American Diabetes Association is quoted in diabetes forecasts saying, “The data from studies indicate that for people with insulin resistance, vitamin D can make a big difference. This is a cheap, safe, effective solution that can make a real impact.”

Further, a report in the journal *Diabetes Spectrum* concluded, “Human studies support the notion that adequate vitamin D supplementation may decrease the incidence of type one and possibly also type two diabetes mellitus, and may improve the metabolic control in the diabetes state.” Optimal serum vitamin D levels are between 40 and 70 nanograms per deciliter, and the most effective supplementation seems to be two to 5000 units per day, depending on blood levels.

Magnesium is another nutrient that's essential for proper blood sugar control. It has an important role in beta cell function and insulin secretion. It’s been shown to increase the number of insulin receptors, improving insulin sensitivity.

One telling studies show that as magnesium levels fall, the rate of diabetes complications increases, particularly heart disease and diabetic retinopathy. According to doctors Rosanoff and Seelig, “Magnesium protects arteries by preventing clotting, reducing inflammation and preventing arterial plaque.” Based on published research studies, the suggested dosage is between 500 and 2500 milligrams of magnesium per day in addition to a diet high in magnesium rich foods like nuts, green vegetables and cocoa.

Zinc is also an important nutrient for blood sugar regulation. Laboratory studies indicated that zinc acts like insulin to insulin sensitive cells, and that may even stimulate the action of insulin. It’s been shown to bind to insulin receptors and activate insulin signaling pathways, which improves glucose uptake. Other studies show that this important micronutrient may also protect the function of the insulin producing beta cells in the pancreas.
A review of literature on zinc and diabetes concluded, “Comprehensive systematic review and meta analyses on the effects of zinc supplementation in patients with diabetes, demonstrates that zinc supplementation has beneficial effects on glycemic control and promotes healthy lipid parameters.” Another studies show that zinc supplementation reduced homocysteine and increased vitamin B 12 levels in people with diabetes and microalbuminuria.

Optimal zinc supplementation seems to be 15 to 25 milligrams per day. Antioxidants have also shown promise for diabetes, blood sugar and the prevention of diabetes complications. One such antioxidant known as lipoic acid has been shown to reduce inflammation and oxidative stress and inhibit glycation reactions, thereby protecting cells from damage. In particular, it’s been shown to improve the symptoms of peripheral neuropathy. Lipoic acid is also an AMPK activator, which helps improve glucose uptake, reduces insulin resistance and has favorable cardiovascular benefits. One study published in nutrition and metabolism showed that lipoic acid reduced inflammatory markers such as CRP, TNF alpha and interleukin 6. It may also be protective and healing to the kidneys.

A 2013 study showed that lipoic acid supplementation lead to a decrease in urine microalbumin in patients with type two diabetes. According to the journal Diabetes Care, “An oral dose of 600 milligrams once daily appears to provide the optimum risk to benefit ratio.” In addition to these, there are several botanical compounds, which have shown to be beneficial for blood sugar health.

A number of studies indicate that cinnamon may help control blood sugar levels; the ground powder of the sweet wood plant, comes from the inner bark of the tree. Cinnamon has been shown to increase insulin sensitivity, improve cellular glucose uptake, up regulate AMPK, stimulate the release of GLP-1, increase expression of PPAR and inhibit the breakdown of starch in the digestive tract.

A 2003 study published in Diabetes Care reported, “The results of this study demonstrate that intake of one, three or six grams of cinnamon per day reduces serum glucose, triglycerides, LDL cholesterol and total cholesterol in people with type two diabetes, and suggests that the inclusion of cinnamon in the diet of people with type two diabetes will reduce risk factors associated with diabetes and cardiovascular diseases.” As that paper recommends, one to six grams of Ceylon cinnamon per day is the most commonly recommended dose.

Barberry is another compound that has garnered a lot of attention recently. It has very similar mechanisms of action to the drug Metformin. It’s been shown to activate AMPK, improve insulin sensitivity, increased glucose utilization in the absence of insulin. It inhibits the breakdown
of starch and absorption of glucose in the gut, and it reduces serum glucose, cholesterol, triglycerides, LDL and hemoglobin A1c.

In one study published in the *Journal Metabolism*, the author concluded, “Barberry significantly decreased hemoglobin A1c levels in diabetic patients. The effect of decreasing A1c was comparable to that of Metformin, a widely used oral hypoglycemic agent. Another study from the European Journal of Pharmacology showed that, “Barberry exhibits significant insulin sensitization, insulin secretion and beta cell regeneration, as well as antioxidant activity. In other words, barberry not only protected insulin producing beta cells in the pancreas, but causes regeneration of those cells, as well. The dose of barberry found to be effective in studies is 500 to 2000 milligrams per day.

A plant called Gymnema sylvestre, which grows in India and tropical Africa has been used in Indian medicine for many years. The active compounds called gymnemic acids have been found to be anti diabetic and anti inflammatory. Their mechanism of actions include delaying glucose absorption in the blood, inhibiting the sweet taste sensation, increasing insulin secretion, regeneration of insulin producing beta cells in the pancreas, and increased glucose utilization. It’s also known to lower serum cholesterol and triglycerides. The most common dose in research is 400 milligrams grams per day. There are many more nutrients antioxidants and botanicals with known benefits for blood sugar and diabetes.

**Dr. Snyder:** The cool thing about the way to use essential oils, whether its internal, it's topical, or it's aromatic breathing them in is, every single way is systemic. So it doesn't matter which way you use them, it's going into the bloodstream, it's going into the cells in your body. And these chemical constituents have the ability to cross through the phospholipid cell layers, they can cross through the membrane, actually get into the cell.

Now when I think about metabolic usage, I often think about internal usage. However, internal usage isn't always necessary and some people may not feel comfortable with internal usage. So then if that's not the case, I would be recommending aromatic usage, because by simply breathing those chemical constituents, they're going straight to the nose, into the lungs through the alveoli, right into the bloodstream.

So we know that people can smell cinnamon oil, and help stabilize blood sugar levels. But we know that they have more powerful impact if they were to actually take a little bit of cinnamon oil and actually put it in their tea or put in a smoothie, they would actually have a more powerful systemic benefit than if they were just to breathe it in.

So it depends on what people's comfort level is between internal and
aromatic. Note that aromatic is going to have a subtle impact, whereas internal is going to have a bigger impact. So that's just something to be mindful of. So they're usually 70 times more potent than the herb counterpart and the dry herb counterpart. That's why we do have to be mindful of using like oregano oil; it is so supercharged in power, a very tiny little bit goes a long way when it comes to dealing with something like Candida or maybe it's dealing with fungus or whatever it may be that people are treating, you need so little to get the job done.

The same instance with cinnamon oil, like one drop of cinnamon oil is the equivalent to about two teaspoons, if not more of cinnamon. So you're getting a big power punch. And I'll tell you what, a drop of cinnamon oil is really potent, and so you wouldn't put that in your tea. You would put that in a capsule.

So you would put that in an enteric capsule that you know it's going to go down into the small intestine and get absorbed into the bloodstream. So one of my other favorite oils that I love for, supporting metabolism and supporting gut health as well and the immune system is going to be ginger, ginger oil is great. Not only does it help support peristalsis, helps to activate digestive enzymes. It also is warming oil in its own right.

It's not as hot as other oils I mentioned a moment ago, but it does have a warming sensation. And it's been shown to boost metabolism and to support a sluggish digestive system, which we know metabolism when it's slow, our digestive system slows down. And all kinds of stuff ensue after that, like constipation, where we have inflammation in the colon and maybe in the small intestine.

And so I love ginger. If people are struggling with even digestive issues, gingers great oil, but we also know it will boost metabolism. So that's a favorite oil of mine that I love. And you can put into the smoothie as well. You can make a little immune system shot with ginger oil. There's a lot of different ways you can incorporate ginger oil into your daily life. And you think about so many different cultures, especially Eastern cultures that use ginger for digestive support and metabolic support.

And then my other favorite oil for cravings because you know, we talked about this a lot, we always think about -- well, why are we consuming so much sugar? Or why are we finding ourselves snacking throughout the day? What's really going on. And I like to call it an unmet need. It's very rarely that your body, your liver, your gut wants that Twinkie or wants the cupcake. If anything, they're screaming and running the other direction.

And so I always want to think about like, how do we -- I know that those unmet needs/those cravings, whether it's exhaustion, or its stress, or its emotions, or maybe it's even unconscious boredom that you don't
realize when you’re watching that Netflix show, you’re not paying attention to what you’re doing.

But if you find yourself in that state where you’re heading to the danger zone, whether it’s the snack room inside of the your office, and someone brought cupcakes four hours ago, and you ignore those for four hours until it’s four o’clock in the afternoon. Or you’re heading to your refrigerator just to see what’s in it because you need something, at that moment, that’s a craving kicking in.

Either it’s your prefrontal cortex getting shut down, your limbic brain is up, you’re in that survival kind of mode where we want to consume something even though our bodies don’t need it. I find this especially the case for women. You know, our bodies if it feels stress, or it feels exhausted, it thinks we’re going to die. You know, we go into the survival mode, and your brain automatically kicks in this need to want something salt or sweet.

Oftentimes, we’re not really needing that. I mean, we think about our liver and how much glycogen we store there at any given time, we have a lot of supply. So my go-to-oil for that, that moment where we are about to eat maybe one or two of those cupcakes, whatever it may be, is peppermint.

So in the *Journal of Neurology*, there was a really incredible study done by Dr. Alan Hirsch. And he looked at breathing in peppermint oil. And what we found is that it will curb appetite. But most importantly, it curbs cravings. And that’s because when you breathe in peppermint oil, menthol and all the chemical constituents in it goes straight to the limbic system and shut that down. But what’s also great, peppermint is also an energy booster. And it also oxygenates the lungs and brings oxygen to the brain.

So it has a multi fold approach. So whether it’s because you’re exhausted or you’re stressed, peppermint is just a great kind of happy, energy boosting oil, but it will literally shut down those cravings in an instant. And I have used peppermint on millions of women, men too, but my mostly women for me and it’s been the lifesaver. Yeah, so it’s my favorite.

And if they want to kind of up the ante, I also find grapefruit oil has been researched as a wonderful, great anti craving oil. And that combination is the perfect energy, perfect booster to kind of get yourself out of that danger zone. And then my recommendations is, once you breathe that oil and just take one drop of each, breathe it in, is then walk away from the room.

*Cassie: *You can eat perfectly healthy and your blood sugars can even
be balanced, and you can still crave sugar. I mean, you know this and a lot of people have experienced this. So Pure GlutaCaps is one that I formulated that has a really potent amount of glutamine, and I love about glutamine. Not only is it the most abundant amino acid in the body, so it's like the most natural supplement you can take.

But it's actually responsible for producing those brain chemicals that determine whether or not we get physical sugar cravings. So I love about this, it's like such a great first step to taking away sugar cravings. And what's interesting, Brian, is like oftentimes we find that people will still have the emotional like, and the habitual craving. And then we deal with that. And in other ways, you know whether it's like just the journaling and figuring out why the craving is actually happening in the first place when you can take away that physical craving.

It's a great first step. And what I also love about glutamine, it works kind of twofold. It can take away sugar cravings, it can prevent them, and bust them when you have them. And it also can heal inflammation.

So even for people that don't get sugar cravings, we still recommend that they take Pure GlutaCaps because it can help to reduce inflammation. And we know that inflammation is the foundation of you know, probably heart disease and cancer and just so many issues that we have, definitely type two diabetes, and weight gain. And the problem is when you have this inflammation that you don't know about, we can't see it or feel it, but our body will allocate all of its resources to try and heal it.

So that’s why if we have inflammation, it can be almost impossible to lose weight, or even have great energy levels because your body’s just trying to heal it. So if we can help our body heals it and takes away sugar cravings in the process, why not? So that’s why Pure GlutaCaps is my favorite supplement.

**Dr. Mowll:** When evaluating these compounds, it's important to work with a practitioner, who knows these well in addition to understanding diabetes medications, and the interactions, the intricacies of blood sugar dysregulation, so they can help you create a customized plan to biochemically support your blood sugar levels.

**Dr. Osborne:** The first and foremost, food has to be the most important thing that you do because if you're eating inflammatory foods on a regular basis, you can take all the botanicals in the world. And it's kind of like spraying a water hose on a fire and on the other side, you're spraying a gasoline hose; you're not really going to win that war if you're adding fuel to the fire. So you've got to really get food dialed in. And so that's different for different people.
Get a functional medicine practitioner, get testing done, find out which foods for you are acting as inflammatory mediators. But beyond that, eat real food. Like, there's a common sense law -- you know, the take-home message, if you will, today is just eat real food; don't eat processed packaged food with lots of you know, dyes and additives and preservatives and other things in them because a lot of those are actually inflammatory too.

So just to kind of a common sense rule of thumb is eat food that is real, that is grown out of the ground or eat grass-fed beef instead of feedlot beef, eat free-range organic chicken instead of feedlot chicken. These are great places to start without taking pills or supplements and other things.

Now, if you really want to take something in a concentrated way that can really be effective for reducing inflammation. Things like curcumin can be very effective, high doses of omega 3 fish oil. You know, I say high doses three to five grams a day, not one fish oil pill that only contains 200 milligrams of EPA or DHA. I'm talking about concentrated doses of those things can be very, very effective at mediation of the inflammatory cascade.

And then one other thing I think that's very, very important is, and I keep saying this, go to a functional medicine doctor, because as a diabetic, I don't think you should be doing it alone. I think you should reach out just like people are reaching out for your class. And they're finding a community where they can find that kind of help. But reach out and ask a functional medicine doctor to test your nutritional levels, your vitamins, your minerals, because a deficiency of vitamins and minerals can actually make it very, very hard for your body to put out fires to calm the inflammation. So I think those things should all be priority.

Marcelle: One of the first-go is to changing your diet, you know, making sure that you're having more protein, getting rid of processed foods, especially sugar, because those are the things, the carbs in the processed foods that really accentuate the blood sugar issues. But also it's finding ways to deal with your stress.

And if you don't understand where the stress is coming from, it's going to be impossible to do something about it. Some of my patients say, “Well, I should exercise more.” If they have adrenal exhaustion, I don't want their pulse rate over 90 because it's too much exercise for a system that's already pushed to its max. So I'll heal their adrenals first. And then I'll have them start exercising, maybe walking and things like that and then, perhaps, going to the gym.

We need exercise, but not when you're pushing your system too much and also taking a really good quality multivitamin with methylfolate in
it. So you've got the methylated folate in that particular vitamin and fish oil, and vitamin D. Those are kind of the foundation that I start with my patients on. And then I'll use botanicals, you know, depending upon what I see, or what I'm suspicious of. I've either I need to bring the cortisol down, I need to bring it up.

**Dr. Espinosa:** Poor artery architecture means poor erections, poor circulation, and an erection is all about circulation. So anything that interferes with that process will cause erectile dysfunction. So diabetes, particularly type two is certainly more connected to your erectile dysfunction as is metabolic syndrome, which type two diabetes is part of that factor, connected as well to erectile dysfunction.

So I think that one of the simplest methods to overcome or treat erectile dysfunction is by treating blood sugars and managing the insulin levels. If there is a metabolic syndrome situation or if there's a very high insulin, hemoglobin A1c that's too high, you manage those things. You know, help them sleep better, some botanicals and things. Absolutely, it's reverse. And then, of course, you have to deal with the psyche.

You know, the biggest sex organ is the brain. So that and then some botanicals like Ashwagandha help quite a lot. And even Epimedium helps quite a lot in terms of increasing testosterone. I know there are some studies on fenugreek showing that it also helps, but I don’t think that one thing helps. When I help patients produce testosterone, they're sort of doing everything. In my world, I deal mostly with botanicals and supplements, and every now and then with some of the pharmaceuticals, things that are important are citruline. So one of the chemicals that help your arteries dilate or open up is nitric oxide.

So how do you produce more nitric oxide? Citruline helps with that; is a precursor to arginine, which then releases the nitric oxide from the cells, from the arteries and then arteries are able to open up, so citruline is very important. The other ones are things like pomegranate and resveratrol. They kind of help with the health of the arteries. Remember, we said that bad arteries are unhealthy arteries, are no good.

So these things help with the health of the arteries; pomegranate and resveratrol. Then we use certain botanicals, adaptogens are very good. So these are things like Rhodiola, Ashwagandha, Siberian Ginseng, excellent, because they kind of address stress in the body and kind of balances out stress and stress chemicals that are produced, including those that are producing your adrenal glands.

You know, cortisol and norepinephrine and epinephrine, those kind of things. So that’s, in essence, the main go-to. There's one more; Epimedium known in the street as horny goat weed. What a name like that, you think there’s no way that works, is too gimmicky. But it's turns
out that there's a chemical Epimedium called Icariin.

And that's actually a PDE5 inhibitor. What does that mean? You inhibit this PDE5, which allows more blood in the organ. That's exactly the mechanism of how some of these drugs work; Viagra and Levitra, they work by having inhibiting effect of PDE-5. So you find the same chemical in Epimedium called Icariin, which has a similar pathway as to how it works.

Dr. Brown: So as a gastroenterologist, I'm a little bit biased, but I believe all health begins and ends in the gut. What we are seeing is that a lot of the inflammatory process actually does really begin in the gut. When we look at, let's say, eating a bad diet that's filled with pesticides and things, you do lead to intestinal permeability or leaky gut. And you've got bacteria growing where it shouldn't, so that's SIBO bacterial overgrowth, that actually produces a molecule called Zonulin, which creates intestinal permeability or leaky gut.

So when I see my patients, and I get a lot of diabetic patients referred to me because they've got intestinal issues, and will notice that they're having more trouble controlling their blood sugars, or the endocrinologist or their regular functional medicine doctor is. And then we realize, okay, well, let's take a look at your gut and let's see what's going on.

When I find out that they have significant bloating, then we look and go, okay, it's conceivable that you've caught yourself into a vicious cycle, where your gut is creating inflammation, your body is responding to that as a pro inflammatory cascade, which ultimately leads to cortisol. And then that keeps rising your blood sugar.

So now all of a sudden, we're chasing each other. So as a gastroenterologist, I can usually help some people out control their blood sugar if we stop the intestinal inflammatory process. Something else that we're now learning is that brain-gut axes that people talk about is also part of this, because when you're talking about the HPA axes, or getting those adrenal started, there is evidence to show that we do create neuro inflammation, that can actually affect sleep, that actually creates the stress hormones to go up again.

So we've got gut that leads to inflammation, that leads to brain inflammation, that leads to stress, poor sleep; now we are sort of chasing ourselves. So it's almost like the glucose is a bit of a warning sign. When I see people that have gut issues, and I asked them, “Hey, is your hemoglobin A1c going up, is your blood sugar a little bit higher? I think we got more going on and just a little bit of extra gas going on.

So if we can stop the inflammatory process in your gut, then we can
help these other things downstream.” It’s the three pillars of health, you got to protect your gut. And the best way to do that is lifestyle, diet modification first. The usual stuff and I’m sure you tell all of your patients, from my aspect, I also want to treat people to make sure that we can get rid of those bacteria so that there’s no more inflammatory response going on.

Polyphenols have now been shown to be an anti inflammatory beneficial molecule that can actually help with blood sugar control, as well. And then I tell all my patients as gastroenterologist; you have to get great sleep hygiene. Let’s turn those devices off before you go to bed, block that blue light. And then try and eat in a circadian rhythm so that you’re not disrupting that. Those are the three things that I mostly do with my patients. And surprisingly, these other issues like you take care of with diabetes and blood sugar control can get better also.

Christa: Definitely number one is to slash inflammation. So doing something like golden milk and starting to eliminate the things that don’t work for you. You know, gluten is the destroyer; sugars, pro inflammatory, the white stuff not the good sugars from roots, and so definitely making sure that you’re going to get rid of inflammation.

But this is definitely a two-hour conversation because it’s like, you know, how many antibiotics have you been on throughout your life? Because if that’s the case, you do need to do a gut repair plan. You’ve got it. Just like we change the oil in our cars, we’ve got to think about healing and sealing the gut on a regular basis. Back to stress, cortisol thins the lining of the gut. And so the more stressed we are -- and we call it a nervous gut. You feel it in your gut, and it starts to kill the good bacteria.

So the steps go slash inflammation, get rid of the pathogens, or at least flip the pathogenic code. And you can do that with your diet, with herbs and spices in a healthy diet. And then you want to make sure you have enough of your good bugs and enough hydrochloric acid to prevent future invasion. Those are kind of the steps to make sure you have good gut health.

But the idea is, I always said Brian, you probably heard me say this a million times. It’s like all disease begins in the gut. And Hippocrates, the father natural medicine said that 3000 years ago, but throughout this research, I realized not actually all disease begins in the nervous system. Because if you have a rock solid, strong nervous system, your immune system -- you will be so much less susceptible to get these gut infections.

But you’ll be so much less susceptible, you’ll be able to maintain strong digestion like it’s the foundation, but as soon as it starts to shake whatever your genetic weakness is, immunity, whether thyroid, whether it’s the gut, then it starts to crumble right from there. So I’m realizing just
how very important it is to focus on this.

**Dr. Mowll:** This is an important topic, and certainly this won't be the last word. Each year, hundreds of new research studies are being published, more medications are approved, and new drugs enter the pipeline. The fundamentals, however, will never change. If you want to have a lasting impact on diabetes and your blood sugar, it's essential to address the root cause with diet and lifestyle modification.

And use other tools such as medications and supplements, as adjuncts short and long term, to support your blood sugar regulation system. In the next module, I'll be discussing problem solving; how to work through challenges to reach your goals and staying in control. This is one of the most important considerations for long term blood sugar health. I hope you enjoyed this information.

I'm Dr. Brian Mowll, the diabetes coach, and I'll see you back soon for Module eight.
Dr. Mowll: Hello and welcome to Module 8 - Solving the Puzzle: How to Work Through Challenges To Reach Your Goals and Stay in Control.” Wouldn't it be nice if everything went right all the time? If your brain were a computer, you could just put input data, like what foods to eat and how to regulate your hormones and blood sugar and everything just happened exactly as you intended. If once you made a decision on what to eat and what not to eat, when to exercise and meditate, how many hours to sleep and which supplements and medication to take, that it just happened every time without fail.

Well, as you know, life unfortunately doesn't work that way. If there is one thing that is always true, it's that you will encounter problems. This is Dr. Brian Mowll, the Diabetes Coach, certified and master licensed diabetes educator, and IFM certified functional medicine practitioner. And Module 8 is all about solving those problems.

I have been helping people with type 2 diabetes, pre-diabetes, and other blood sugar and metabolic problems for almost 20 years. Over that time, I've helped people overcome dozens of problems related to their program, their body, and their health.

Sachin Patel: So, the first thing I will say about any disease, but in particular diabetes, that the most difficult thing about diabetes is not the disease but the it's the diabetic. So really understanding that,
unpackaging that, that's a pretty loaded statement, but I want to unpack that for everybody. So, your body's never trying to fight you if you are trying to get healthy. There is no resilience to that. There is no combativeness.

So, one of the things that we have to first change is the language and the dialogue that we use toward this process. There’s no war on diabetes just like there's no war on cancer, there’s no war on autoimmunity because the body doesn’t fight back. The body wants you to do what's right for it.

Now one thing to understand, when it comes to diabetes, is that blood sugar is not only influenced by what we eat. This is a very common misconception. Blood sugar is influenced many times by what we eat but it is also influenced by something caused cortisol. Cortisol's main function in our physiology isn't for it to be a stress hormone. It is actually to be a blood sugar increasing hormone.

So, cortisol's main job in our body is to raise blood sugar. So, guess what, anything that raises cortisol consequently raises blood sugar. One of the ways we identify this with our clients is we have them wear a continuous blood glucose monitor and, while they are wearing this continuous blood glucose monitor, we're tracking their blood sugar every 15 minutes. Every 15 minutes the device takes a little snapshot of what their blood glucose levels are, and we can populate a little chart over time to see what their blood sugars are.

What is really fascinating is that we can see the impact that food has but then we can also see the impact of arguments or the impact of traffic or the impact of jumping on your computer and answering e-mails. We can actually see people's blood sugar go up in the absence of actually eating something and it all has to do with their cortisol levels.

So, a lot of times people will come to us or they might come to you or they might come to their healthcare provider. They are doing everything right when it comes to their diet and nutrition, but they're not doing everything right to balance their autonomic nervous system and, specifically, their stress response which raises cortisol which then raises their blood sugar. When your cortisol is elevated, the other thing that happens as a natural by product of that is that you become insulin resistant.

Once you become insulin resistant, the blood sugar stays higher than normal. That of course, we know creates a whole set of complications as a result of chronically elevated blood sugar. So, it is the cortisol that raises blood sugar, increases insulin resistance, and then, over time, you can also become cortisol resistant. What that means is that you have to make even more cortisol to create the same stress response or the
same blood sugar response than before.

So, sometimes, when people become insulin resistant, we have to go a step above that and realize that these people probably are also cortisol resistant and the one thing that disrupts cortisol is melatonin. So, we can actually use melatonin because your adrenal glands do have receptors for melatonin and that actually shuts off cortisol production.

So, we can use melatonin as an aid to shut off cortisol production which then balances the blood sugar, when then also balances insulin and uncouple that insulin resistance and cortisol resistance that people develop over time.

**Dr. Mowll:** One of the most of important keys that I will teach you today is how to identify those problems ahead of time and create solutions so that when they happen, you are well prepared.

The most common problems that I see with the clients I work with include the following:

1. Making good food choices while traveling, during the holiday get togethers, or while attending social occasions, especially when there limited foot options available.

2. Falling off track with an exercise or dietary program and having trouble getting recommitted.

3. Needing to adjust medication, such as diabetes and blood pressure drugs or insulin as you lose weight and see improvements in your blood sugar levels and overall health.

4. When unhealthy habits, such as staying up too late, snacking and skipping workouts, start to creep back into your life.

5. Also, sick days when blood sugar levels spike due to an acute stressor at home or work or battling an illness like a cold or flu.

6. Diabetes burnout. Getting tired of checking your blood sugar. Forgetting or running out of test strips leading to a break down in self-monitoring.

7. Hypoglycemia when blood sugar levels drop too low because of medications or after particular activities, such as exercise, causing symptoms, concerns, and uncomfortable feelings.

These are just a few of the most common problems that I've helped my clients deal with, plan for, and overcome with the strategies that we will discuss today in this module.
Dr. Jody Stanislaw: I was diagnosed in 1980. So, I've lived with type 1 for almost 40 years, so I've seen a lot through these 40 years. And, unfortunately, we would think that management would be much more advanced than it is now. The reality is, most type 1's truly have not received the education that they need to be in good care and, unfortunately that word, uncompliant, is thrown around a lot which, I think, is very unfortunate, because the reality is, they really are not given the education they need.

When I help patients – I've created a virtual practice, so I help patients around the world and my absolute mission is to get my online course to as many type 1's as I can. Most type 1's learn that they need one unit of insulin per 15 grams of carb and that's kind of all they learn about how to dose for their meals which is very short-sited because there's different speeds of carbs, glycemic index, if they digest slowly, quickly.

Protein affects your dose. Fat affects your dose. How much food you're eating affects your dose. Timing of day affects your dose. How active or inactive you've been affects your does. If you have been sick. If you have been stressed. If you don't get enough sleep. Those 10 more variable I just rolled off my tongue and yet they learn, “OK, just count your carbs and take one unit for every 10 carbs or 15 carbs or something.”

So, I've had patients come to me and they will say, “I am not even going to try. I've given up because, even when I tried, I couldn't get good numbers.” And the reality is, they know this much [holds thumb and index finger barely apart]. I think the breakdown is truly that type 1 is such a complex disease but yet not that prevalent. That's really the problem is that good education is not given to the type 1 because the physicians themselves probably are not that comfortable with it.

Dr. Mowll: What I would like you to do is write down some of the problems that you have already encountered or ones that you are concerned about and we will walk through a process of creating solutions for those problems. So, go ahead and write down at least five problems right now on a blank sheet of paper.

Next, I would like you to start brainstorming some possible solutions to these problems. You can do this, using the acronym S.O.A.R., coined by David Rosengren. It stands for Set goals, Options/possible solutions, Arrive at a plan, and Reaffirm your commitment. The ADA has a nice worksheet that you can use to assist you in this process. It's best to use your own list of potential problems but this can be a very helpful example to help you get through the process.

It says, “If you get the flu and notice that your blood sugar levels are higher than normal, what do you do?” The goal might be to monitor and optimize your blood sugar during the illness. Options might include
something like, make sure that I stay well hydrated, eat less if I'm not hungry, take my supplements and medication as prescribed, or adjust my insulin dose. Then you would create the plan and reaffirm your commitment.

There are several other example problems on the work sheet that you can work through. For other problems, such as why you stopped regularly checking your blood sugar. Ask yourself, “Why is this a problem? Why does this happen?” Then write down your goal, two things you can do to fix the problem, and share something you can do to prevent that problem from happening again. Create your plan to discourage this from happening again and then reaffirm your commitment.

So, let’s take a look at some common problems and some possible solutions. One problem that I often hear from my clients is navigating holidays, special events, vacations and traveling. Maybe this is a challenge for you, too. There are several strategies that I found to work well for most people.

First is to plan ahead. If you are going out to a restaurant for example for a special occasion. Call ahead and ask the manager to e-mail or fax you a copy of the menu. Sometimes, you can even find the menu online. Then study the menu and choose what you order ahead of time. This will help you avoid a stressful or unpleasant experience once you get to the restaurant.

For weddings, holidays, and other special events, I often recommend eating before you go. If you go to the event already full, you are much less likely to choose unhealthy foods and you can focus more on socializing and enjoying the friends, family members, and others at the event rather than focusing on the food. If you decide to eat at the event, make the best choice that you can based on your available options.

We all find ourselves in difficult situations at times. The key is to evaluate your choices and make a decision based on your health rather than your desires. Most of my clients will say that the five minutes of pleasure from the piece of bread or cake is not worth the hours or days spent trying to regulate their blood sugar or fight those increased food cravings.

For vacations, it is important to plan and prepare. Bring some healthy snacks like raw nuts or organic jerky with you. When you get to your destination, make a quick trip to the store and pick up some fresh vegetables or restock your healthy snacks. Don’t expect perfection from yourself and do the very best that you can given your circumstances.

There are always some strategies that I recommend for recovery from a
dietary lapse. One rule that I share with my client is the next meal rule. If you find yourself overeating at a meal or choosing foods that may not be the most ideal. Reset yourself immediately at the very next meal. That means, next time that you eat, make sure that your meal is a healthy, low carb, balanced meal that will help to reset your blood sugar and metabolic hormones.

Another strategy is getting a little exercise after the meal. I often recommend taking a long walk or running around in the yard after a heavy meal. This can increase your metabolic rate, insulin sensitivity, and glucose uptake and make up for those extra carbs or calories that you just ate.

Another common issue is how to deal with a plateau or a stall in your weight loss or blood sugar improvement. It is completely normal for weight loss or blood sugar improvements to stall at some point. Getting frustrated with this phenomenon can lead to a loss of motivation and can lead you to make poor choices.

There are several other ways to deal with this type of problem which are more productive. First, stay consistent and wait it out. Usually, at some point, if you stay consistent, your weight or blood sugar will start to improve again. Sometimes, the body just needs to recalibrate and establish a new set point before it starts to release weight or adjust homeostatic blood sugar again. If you are not quite that patient. You can try shocking the system with a change. This might be with a new exercise program or a different dietary strategy.

In Module 9, I will discuss a variety of dietary strategies that have been shown to be successful for weight loss or blood sugar control. Either way, don't give up. That's the only way to truly fail. Stay positive. Stay focused on your goals and your core motivation and keep pushing ahead.

Lastly, I will address how to deal with low blood sugar episodes, also known as hypoglycemia or sometimes called hypos. This happens when your blood sugar drops below the adequate level, usually 70 mg per deciliter or 3.9 millimoles per liter leading to symptoms such as dizziness or lightheadedness, intense hunger, headache, irritability, blurred vision, and sweaty, jittery hands.

In some cases, hypoglycemia can be very dangerous leading to confusion, antagonistic behavior, loss of consciousness, and seizures. The most common causes of hypoglycemia in someone with diabetes is over medication with insulin or sulfonylurea drugs, especially in conjunction with skipping meals, exercise, or alcohol. The AADE [American Association of Diabetes Educators] recommends handling hypoglycemia using something called the Rule of 15. If you are experiencing symptoms of low blood sugar and you find that your blood
sugar is under 70, you will want to take 15 grams of quickly digestible carbohydrates like 4 oz of apple or orange juice or 2 tablespoons of raisins.

Then you will wait 15 minutes and recheck your blood sugar. If it is still low, repeat the process with another 15 grams of carbohydrate until your blood sugar reaches normal levels. Other possible sources of 15 grams of carbs are 1 tablespoon of honey or syrup, 6-8 lifesavers, or 3-4 glucose tablets. It is best not to overcorrect by grabbing whatever is available like a cookie or doughnut or chugging a soda. This will lead to a roller coaster effect and make things much worse.

It is also important to realize that you need some carbohydrate to correct your blood sugar. Eating a serving of almonds or a hardboiled egg is not going to do it. If you ever experience hypoglycemia use the guidelines that I just recommended using the rule of 15 and you will stay safe and healthy. This type of strategic planning and problem solving will help you avoid common pitfalls that derail your progress. Challenges will inevitably still happen but the better you become at problem solving, the more easily and effectively you will be at overcoming these challenges to stay on track with your health and healing process.

Jonathan Bailor: The first and most important thing is try. And I know that we could spend all day on this part but believe that you are worth fighting for because this will kill you if you don't fight for yourself and you are worth fighting for. I promise. Like, if not for you, for those people who depend on you or those people who love you or those people who will or could love you in the future. You're worth fighting for.

And the second thing, and this might sound a little bit boring but, dear God, eat more vegetables. Stop worrying about don't do this and this is bad and these things are evil. If you, every time you eat food, eat non-starchy colorful vegetables, I would argue, and a lot of research supports, that that is the most effective treatment with no negative side effects, only positive side effects, for diabetes care.

The third thing would be I would strongly encourage you to explore alternative methods to prepare baked goods and/or sweets. Some people think that they can never experience the taste of sweet again and that's the only solution to this. I am here to tell you that there are things like coconut flour, almond flour that are decadent and delicious.

And not only that, coconut and cocoa or cacao, these are some of the most healing foods on the planet and if you use these things with alternate sweeteners like Stevia or erythritol or monk fruit or lo han guo and you have to think what kind of crazy crap is he talking about right now. The good news is this is such a widespread epidemic that the ability to find recipes that allow you to create delicious dishes that
will actually help to reverse diabetes is possible. So, you don't have to say, I can never enjoy anything that tastes good ever again, just look for smarter, saner options in those categories.

**Dr. Mowll:** As you continue to work on getting in control of diabetes and blood sugar, it is important to assemble a good diabetes care team for yourself, as well. You doctor will likely be part of that, and you will probably want to have a pharmacist to ask medication questions. You may have an endocrinologist for specialized care, although this is typically unnecessary.

You will need an eye doctor, an ophthalmologist, to do your annual eye exam and help you will eye health, a dentist for your teeth and gums, and a foot doctor, such as a podiatrist, to examine and help you care for your feet. You doctor may recommend a nutritionist or registered dietician to help you organize your food plan and a personal trainer or exercise specialist to help you with your physical activity. In some cases, you may need to consult a therapist, psychologist, or social worker as well for mental health.

Lastly, it is important to have a diabetes coach which can be a specially trained health coach, a nurse educator, or, preferably, a CDE, a certified diabetes educator, to help lead and coordinate your care.

**Sarah Hallberg, DO:** They enter in their blood glucose and that allows the health coach to personalize the nutrition recommendations and it allows the physician to make those medication changes, again, in close to real time. So, the blood sugar gets entered, the physician can right away react to that. Not the next week, or next month when they go for an office visit and the health coach support is critical.

But they are also able to be supported by their peers who are also going through the same thing. They have access to recipes and other resources and instructional videos. And even we have their own Virta cooking show with the health coaches that they know themselves. So, so many different ways to support people through sustainable changes.

**Dr. Mowll:** You will see most of your doctors and health care practitioners between and one and four times per year. This is good for monitoring major health problems but usually not adequate to help you get and stay in control of your blood sugar and diabetes. Our modern medical system was not designed for chronic health conditions such as diabetes. It excels when caring for acute problems like physical injuries and infections.

Doctors are trained to try to solve the problem in front of them right away. They may order a test or prescribe a medication or treatment and recommend a follow-up. Then they are trained to move on to the next
patient and the next patient and the next patient. The average primary care physician in the U.S. is managing 2300 patients.

It's impossible for them to adequately provide the continuity of care that best serves someone with a chronic condition or disease like diabetes. That's why it is important to work with a coach who you can check in with every week or even multiple times per week. You want someone who understands your specific goals and who's willing to work with you to help you achieve those goals instead of forcing a standardized, one size fits all agenda on you.

**Andrea Nakayama:** In our clinic at the Functional Nutritional Alliance, we will often see people who are getting the right medical treatment, but it is too fast for their body. They don't have the resilience and the mechanisms that their body needs, so we need to slow down, repeat before that intervention can happen. So that tier 2 work, deficiency can be in love or play or joy, especially for people who are sick and suffering and not getting better connection. So, all of these things are deficiencies. It is not just thinking about our nutrients or the supplement that we need, it's everything in our whole life.

**Mark Menolascino, MD:** Well you know, Dean Ornish, I worked with him when I was in high school, and he showed that, instead of having a cardiac bypass for blockage, you could do lifestyle medicine. They did a study in Minnesota looking at lifestyle medicine versus the topline diabetes medication. Lifestyle medicine beat it out. So, we know that proper exercise, looking at your nutrition, having some stress relief in your life, having some love and social support is lifestyle medicine that beats a cardiac bypass. Dean Ornish's group has still done better now 35 years later.

So, we know that these programs work for reversal of diabetes, for reversal of heart disease and it is really putting it all together. What's your story? What's unique about you? How do we get lifestyle medicine to work for you? And that's what I think you do in your program so well; is you personalize it. Some people don't like to jog. Some don't like to go to the gym. What do you like to do that we can help you and help you develop this lifestyle plan where food is your medicine, kitchen is your pharmacy, lifestyle is your doctor?

**Dr. Mowll:** You need your physician, as well as the rest of your diabetes care team, but you also want a diabetes expert whose in your corner who listens to you and who will be there for you to support your when you need it. Don't depend on your doctor to create this care team for you. You know yourself best and it's up to you to find and assemble the team that will serve you and support you.

**Jake Kushner, MD:** I think, ultimately, it is really about putting together
like a support team because it is easy to say I want to do all these things; it is very hard to actually do them. So, finding other people who are similarly impacted who have type 1, learning from them and then also giving back to the community and helping others can make an enormous difference. What you are trying to do when you do that is to be more aware of your process, the journey of learning around type 1 diabetes. That kind of diabetes mindfulness can be enormously helpful.

Realistically, if you try to do this alone, it is very lonely. It is challenging. So, you need support. What we call diabetes distress, where you are aware of living with diabetes and it’s interrupting your ability to think about other things. I often ask people to actually be mindful of, like how they feel and what are thinking about right now.

So, I will often ask people in my practice, tell me about diabetes distress. Tell me about how you think about your diabetes. I even use a Likert scale, or I will say I want to describe diabetes distress on like a 1 to 10 scale where 10 means you are thinking about diabetes all the time and you can barely think about anything else. And a one means you know you have diabetes, but you don’t think about it at all. Then I say, “So, if it is a 1 to 10 scale, where are you right now?”

And quite often people will look at me and then you can just see the blood drain from their face because no one has ever asked them. And, when they begin to answer, they will ashamedly say a 7 and I have seen people start to cry. I mean, it is very stressful. The stress of living with diabetes is immense whether it is type 1 or type 2 but talking about it is a way to be able to go on the journey to ultimately reduce that strain to reduce the cognitive burden of thinking about diabetes and find a way to live life and to love it.

Dr. Mowll: In addition to your diet or your blood sugar carotene, there are support care networks that many of my patients and clients have found helpful. These include Facebook groups, local support groups, meet ups, and friends or family members who will support and encourage you.

Find people who share your health philosophy, goals, and who want to eat a similar diet or lead a similar lifestyle to what you’re choosing to do. It is very difficult for someone to support you who doesn’t understand what you are doing and why you are doing it. Find a community of like-minded people, locally or online, and engage with those people to get and give support.

James Maskell: Look at the fundamentals of health creation. What do you have to do every day to be a healthy human? There’s this big gap, at the moment, between health creation and disease management and any group that is created with the energy of the disease management is
like not really taking best advantage of what the power of the group is for. The power of the group is really there to facilitate transformation of behavior. So, that will be food. That's a big thing.

So, you can talk about food. You could talk about how to create healthy food. Some of the most innovative groups are actually getting groups of people to cook together because typically learning to cook is a big issue. It is a big thing that has to happen for people to be able to change what they are eating. If they are still eating out the whole time, it's not easy to be healthy.

So that's the first thing, food, but then you see, like what are the other fundamentals. So, the relaxation response, stress, so meditation; teaching people who to do that in a group structure. Having people be accountable to each other. With regard to the food, my mother-in-law, about five years ago lost 110 pounds and the only thing that changed is that she had to call someone at the end of the day to tell them what she'd eaten that day.

No money changed hands. It was kind of like overeaters anonymous or something like that, so no money changed hands. There was a mentor and a mentee. But just that, one call every day or the threat of that call every day. Like her behavior changed because she didn't want to have to call that guy and say, “Hey I stopped at McDonald's. I messed up. I drank the big gulp.” So, now, that's an incredibly efficient process. Peer to peer accountability in those groups.

I said meditation, but exercise. Anything that is healthy in an individual way, like exercise, is healthy as a group. Walking clubs, running clubs, even things like you see – I don't know if you have ever seen the videos of people in China – where they are all doing T'ai Chi together or they are all doing qigong. Finding ways for people to exercise and be together in community. So, any healthy behavior that you have ever been prescribed, if you try and do it as part of a group, it sticks for longer. You stick with it and you have got a supportive community to help you maintain the behaviors.

We are just at the beginning of this. I think that there is enough to show that it can be possible. I've seen things happening even like your Facebook group for example, people supporting each other as they start making changes, saying hey, I am wondering about this, can you help, and five people jump in and say, “This is my experience. This is what I have found.”

You know, one of the most powerful things that we found with groups, Brian, is that the person who has been through the process of actually reversing their diabetes, in this case, if they have actually done that, they are much more credible to the other people in the group than the
physician. Even if the physician has had an incredible experience with diabetes themselves, hearing from someone else, “This is possible. I did it. This is what I did” has like a transformational effect. It’s inspirational but it also gives a sense of like I can do this and stick in for the long-term.

I think the goal is, how do you introduce people who want to be healthy to each other and then how do you kind of like get out of the way in a certain way so these people can maybe just be friends, right, for a long and extended period of time? That is like diabetes prevention, never mind just reversal.

**Dr. Mowll:** There is nothing more powerful than a group of people with a common mission and common goals to bring transformation. In our next module, I will be discussing several topics including plant-based and vegetarian diets, ketogenic diet, and fasting. I will help you to understand if and when these strategies might be helpful or appropriate and when they should be avoided. Until then, this is Dr. Brian Mowll, the diabetes coach. Remember to keep climbing and I will see you back soon for Module 9.
Module 9
Special Topics: Exploring Interesting Ideas for Achieving Better Blood Sugar

Dr. Mowll: Hello and welcome to Module Nine: special topics, exploring interesting ideas for achieving better blood sugar control. Spend an hour searching the internet for diabetes or blood sugar information and you’re bound to find two experts claiming excellent results, recommending seemingly opposite things.

Talk to friends, family members or people at church about losing weight or treating diabetes or prediabetes with diet, and you’ll probably hear a few amazing success stories from people saying they’ve found the Holy Grail or diet or some magical formula that will solve all of your problems. Sometimes it seems like there is another mysterious concoction or another fad diet being promoted every week. And most of them will fade away into the abyss within a few months or years because they don’t work, at least not for a significant percentage of people and certainly not long-term.

There are however, several strategies which have been used for hundreds of years if not thousands of years which have shown consistently good results with significant numbers of people. While I’m not endorsing any or all of these strategies, they might be worth trying at least on a short-term therapeutic basis, to help you overcome blood sugar challenges, lose weight and regain control of diabetes.

Before I get into the specific strategies that I’ll be covering in today’s
module, let me say just a word about challenging the status quo and expanding our medical toolbox. Abraham Verghese said, “I think we learn from medicine everywhere that it is, at its heart, a human endeavor requiring good science but also a limitless curiosity and interest in your fellow human being, and that the physician-patient relationship is key; all else follows from it.”

It's that curiosity and willingness to expand the mind and expand perception to assess what works best for each person, rather than applying blanket recommendations to groups of people based on their diagnosis or condition. That will allow us to find better solutions and personalized medicine for optimal results.

Some of these potential treatment tools may sound contradictory at first and in fact there may be parts of one program that does contradict a part of another program, but that's okay. Each of us is different and there is no one right way to eat or live that makes the biggest impact on everyone's health and blood sugar. My name is Doctor Brian Mowll, the diabetes coach. I'm a certified and master licensed diabetes educator, an IFM certified functional medicine practitioner. So with an open mind, let's dive in and learn about some of these special treatment options.

As I discussed in module two, in its diet and lifestyle guidelines the ADA leaves quite a bit of room for a personalized eating approach. In fact, they specifically state that there are, “A variety of eating patterns which are acceptable for the management of type 2 diabetes and prediabetes including, Mediterranean-plant-based and low-carb diets.”

Dr. Bland: I think personalization is a very important part of this story because what often happens when these things start to become understood by the general consumer, the non-medical public, they can be reduced down into a simple story which makes it palatable for people who are not medically trained, but may also simplify it to the point that it loses some of the important information along the way.

And so it leads us often to these debates that we see with book writers in the media about what’s the perfect diet, as if there was a perfect diet for all people to manage body sugar. There’re certain principles, I think, that are applicable. But people vary so significantly one for the other.

And I'm really called to this over some work that's been done that I know you're familiar with. This started in Israel at Haifa University and Weizmann University, where they were actually looking at the effect that different foods had on blood sugar and they were doing it in different individuals. They did a very dramatic study, a really complicated study. 840 presumably healthy individuals, they measured their diets and all the foods they were eating carefully for sixth months, they measured their blood sugar after eating there’s postprandial meaning post
eating. They measured their activity levels, they measured their gut microbiome, the organisms that inhabit their intestinal tract. And they tried to understand if there was a way that they could predict how food in an individual would affect their blood sugar.

Assuming that maybe it would be just a simple equation, that they could get this food produces this effect. And this comes back to what's called glycemic index; that a certain food produces a certain effect. And what they found was that there's an unbelievable variation from people to people on the same food at the same amount and how it influences their blood sugar.

And then they started saying, “Well, hold up. Why would that be? We have these general rules that this food is going to do that to your blood sugar and that food's going to do something else. But now we're seeing that there's a variety of effects in the different people.” And what they found is that it's influenced by our gut microbiome. And by actually sampling the gut microbiome, they were able to use a complex algorithm, an equation to predict how a food in that individual, prepared in a certain way, would influence their blood sugar.

Now, at first in the traditional endocrinological field people said, “That's ridiculous. That can't be a predictor. What your gut microbiome is, is going to predict how you respond to your diet.” But now with extensive duplication of these studies and other investigators now in the top journals and high peer review, it's been proven that the gut microbiome has a huge role to play which is individual to each person in how a certain food is going to influence their blood sugar. So it's not just the rule for everyone of the diet that's perfect, it's the diet for that individual. So here is where personalized healthcare and personalized lifestyle medicine becomes very important.

**Dr. Mowll:** The first one I'll discuss is the plant-based vegetarian and vegan diets. There's quite a bit of published research indicating that the more plant food someone eats, the less of a chance that they'll develop diabetes. Doctor Michelle McMacken, known as the Veg MD states, “Diet and lifestyle particularly plant-based diets, are effective tools for type 2 diabetes prevention and management.”

Most of these studies have not looked at people eating exclusively plant foods but have used data from large studies, to correlate consumption of plants versus animal foods and risk for diabetes. However, one study from *Diabetes Care* which focus more on prevention, showed that vegans and ovo-lacto vegetarians had the lowest diabetes risk, followed by pesco and semi-vegetarians compared to non-vegetarians.

The author states that this might be attributable to other lifestyle factors such as a cleaner more active lifestyle in the vegan and vegetarian
groups. As far as using vegetarian diets for diabetes management, vegan advocate Doctor Neal Barnard states in his review literature, “Evidence from these studies indicates low fat vegan diets are at least as effective as more conventional diabetes diets for weight reduction and glycemic control.” It’s important to note, that the vegetarian diets that performed best according to Doctor Barnard’s research focused on, “Low glycemic index foods such as beans and green vegetables.” And he attributed the benefits to increased weight loss in the vegetarian group.

Why does a plant-based diet help control blood sugar and diabetes?
According to a study published in the *Journal of Geriatric Cardiology*, “Multiple potential mechanisms underlie the benefits of a plant-based diet in ameliorating insulin resistance including promotion of a healthy body weight, increases in fiber and phytonutrients, food microbiome interactions and decreases in saturated fat, advanced glycation end products, nitrosamines and heme iron.”

Most vegan diet experts recommend a very low fat diet for people with diabetes and metabolic issues. This is based on the correlation between insulin resistance and elevated fat in the blood and organs. The recommendations are typically less than 30 grams of total fat per day. This recommendation is very low and forces you to not only give up animal products but to avoid or drastically reduce high fat fruits and vegetables such as coconut, avocado, olives and many nuts and seeds.

The diet would then consist mostly of green vegetables, fruit, starchy veggies, beans, legumes and whole grains which may be eliminated in some versions of the diet. The most obvious problem with this approach is that you’re almost forced to eat a high carbohydrate diet which drives blood sugar and insulin requirements higher. It can also be challenging to get enough high quality protein which helps build and maintain lean muscle and satisfies the appetite. Lastly, while many people have experienced positive results using a vegan or vegetarian diet, many others find the low fat vegan approach to be unsatisfying due to the lack of healthy fats and quality protein in the diet.

**Dr. Stanislaw:** To be honest, if you’re eating high carb, you’re not going to get good numbers. I’m sorry, it’s not going to work. The conventional medicine, what they teach is that you can eat anything you want and take more insulin. And they even do this at diabetes camps and diabetes events. You’ll see bagels and crackers and cookies and it’s not possible because it’s that hard to get your mealtime dose correct.

And the reality is, if you eat a ton of carbs, you’re probably going to shoot super high and then you have to give a dangerously high dose of insulin that you pray hits when you actually need it and not before or after because then you have a devastating high or low, if it hits at the wrong time.
So timing of rapid insulin is incredibly complex and it’s not as simple as I’m eating 100 carbs so I’m going to take 10 units of insulin. So you’ve got to eat low-carb. And yet eating disorders are also very high in type 1. So I’m very sensitive to helping my patients find a diet that works for them, that’s not restrictive which I also think is something that’s really left out a lot.

So I dealt with an eating disorder myself. I was in an eating disorder rehab center for two months. I mean, I weighed and measured every single bite of food I ate since the age of seven, until I was in college so I started rebelling in my teen. So I’m very cautious when I give dietary recommendations but I’m very firm that if you want good numbers, low-carb has to be in it.

**Dr. Mowll**: There are also concerns by many scientists that eliminating animal products all together may lead to potentially dangerous micronutrient deficiencies particularly in calcium, vitamin D and vitamin B12. This can typically be remedied though, with a high quality multivitamin. Next let’s look at the ketogenic diet.

If a plant-based diet, vegetarian diet can be beneficial for prevention and management of prediabetes and type 2 diabetes, does that mean that we must avoid animal products and eat a low-fat diet? Not necessarily. In fact, there’s at least as much if not more evidence showing that a low-carb high-fat ketogenic style diet can be beneficial in managing blood sugar and diabetes, losing weight and reversing many of the risk factors for cardiovascular disease.

**Robb**: It’s maybe an over simplification, but the type 2 diabetic state you could argue is a scenario of glucose intolerance, glucose toxicity. People are exposed to an internal environment in which glucose levels are chronically elevated to a degree that it can cause blindness, neuropathy, limb loss, death, all kinds of significant problems. So if the problem is too much carbohydrate or too much glucose, why don’t we limit glucose and carbohydrate in the diet as a means to kind of start reversing the process?

Now, it’s not entirely that simple, the whole state of insulin dysregulation is not just driven by carbohydrate, it’s driven by an over consumption of food at large and depending on your makeup some people are good at storing large amounts of fat without becoming insulin resistant.

I’m interesting in that I don’t really gain a ton of body weight if I start eating in a way that is too many calories, to many carbs for me. My blood lipids go crazy and my blood pressure goes up. So ages ago this thing called the metabolic syndrome was kind of delineated and it was elevated blood glucose levels, elevated triglycerides, dyslipidemia, and also increased body fat levels. Not everybody gets all of those different
pieces which is why it's sometimes hard to unpack.

But the fundamental takeaway of why a ketogenic diet would be valuable for someone who is experiencing type 2 diabetes or prediabetes is that, one, we are reducing the glucose load, the glycemic load, but then two ketogenic diets or even something like a high protein paleo diet that is getting carbohydrates from whole unrefined sources, both of those tend to be highly satiating so people tend to not overeat. So they spontaneously reduce caloric intake.

And then once we offload some degree of that fat mass and insulin resistance, then we may get to a spot in which we have more of a normal glycemic kind of response. So it's again, if you really get into the nitty-gritty of what's going on with type 2 diabetes, we have to have a little broader picture than just the carbohydrates story.

But what's interesting is every single clinical intervention that has looked at low-carb diets for diabetes and prediabetic populations has shown very favorable outcomes. So at the end of the day, instead of all the pissing match over the mechanisms of causation, if we just focus on clinical outcomes, some sort of a low-carb or ketogenic diet is very effective.

**Dr. Mowll:** One study published in *Nutrition & Metabolism* found that, “The low-carb ketogenic diet, had positive effects on body weight, waist measurement, serum triglycerides and glycemic control in participants with type 2 diabetes.” They also summarized that, “Because the low-carb ketogenic diet was so effective at lowering blood glucose, diabetes medications were discontinued or reduced in most participants.” Another study compared a low-carb ketogenic diet to a low glycemic diet in patients with type 2 diabetes and found, “The diet lower in carbohydrate, led to greater improvements in glycemic control and more frequent medication reduction or elimination than the low glycemic index diet.”

There’s some concern that the low-carb ketogenic diet may not be a good long-term strategy. However, several studies refute this assertion. In the journal of *Molecular and Cellular Biochemistry*, a group of patients with type 2 diabetes following a low-carb ketogenic diet, were followed for 56 weeks and the authors concluded, “This study shows the beneficial effects of ketogenic diet in obese diabetic subjects following its long-term administration. Furthermore, it demonstrates that in addition to its therapeutic value, low-carbohydrate diet is safe to use for a longer period of time in obese diabetic subjects.”

Another study published in *The Journal of Pediatrics*, evaluated a group of patients following a very low-carb diet as a long-term lifestyle strategy. The results which surprised many researchers showed that the average
A1C among study participants was 5.67%. And they experienced better glucose control with less hypoglycemic episodes than patients following a conventional diabetes diet program.

McKenzie and Hallberg at Indiana University have been studying the effects of the ketogenic diet on management and reversal of type 2 diabetes and have released six months and one year study results. And they are currently completing a two year trial. In their one year trial published in *Diabetes Therapy*, they reported astonishing results.

They found on average those in the low-carb ketogenic diet group, “Lowered hemoglobin A1C from 7.6 to 6.3, lost 12% of their body weight and reduced diabetes medication use. Additionally, 94% of patients who were prescribed insulin reduced or stopped their insulin use and sulfonylurea medications were eliminated in all patients.” After pouring through thousands of research papers and journal articles, I can confidently say that no medication, diet or therapeutic approach has been shown to achieve results of this significance.

**Dr. Axe:** What makes the keto diet so different and also so effective especially for diabetes and balancing insulin levels, is the fact that your body gets into a state of ketosis. So this is something that doesn’t happen with any other diet except for with fasting. And so actually the keto diet was discovered through children who were having epileptic seizures, started fasting and the physicians realized that the seizures went completely away.

And they said, “How can we create a diet that mimics fasting to where something happens with your insulin level becomes balanced?” And they found that when you get rid of the carbs, you increase the fat, that your body actually essentially gets into this fasting state or gets into a ketosis where your body rather than breaking down carbohydrates for energy, it starts breaking down fat for energy.

So it breaks down dietary fat, your body breaks down its own body fat, turns those into something called ketone bodies and these ketone bodies or ketones your body can use as fuel. Your brain loves it as fuel, your body loves it as fuel. And so the keto diet is really effective. In fact, I think it is the most effective diet or one of the most effective diets when it comes to balancing insulin and reversing diabetes. The other thing I do want to say that I think is really incredibly important with anybody who's looking to reverse diabetes is, there is a right way and a wrong way to do keto.

You know, when I’m on social media today I see a lot of people calling things keto meals where they’re eating conventional bacon, conventional butter and that’s almost all they’re eating. I had a patient come in one time, his name is Doctor Bill, and he said, “Doctor Axe, I just got on this
thing called the keto diet.” He was a new patient. I said, “Bill, let me see what you’re eating,” and it was like butter, bacon and burgers every meal.

You want to get lots of vegetables, you want to get lots of healthy fats. And so when somebody’s following the keto diet the right way their meal plan should look like loads of healthy fats from things like coconut, avocados, olives and olive oil, wild cod fish like salmon, grass-fed beef, nuts and seeds, even almond butter, and pistachios, and macadamia nuts.

We want to be getting lots and lots of healthy fat in our diet. Even things like grass-fed butter and ghee are fine, but you want lots of healthy fats. You want loads of vegetables and you want a lot of collagen in your diet as well, that’s going to support regeneration of healthy tissues in your skin, hair, nails, your bones, your gut lining, your arterial walls, all your joints. So that’s really critical as well.

But I think when somebody’s doing the keto diet the right way, it’s not all butter and bacon, it’s a very nutrient dense diet, high in health healing fats like healthy saturated fats, omega-3s. Lots and lots of vegetables and then collagen and other phytonutrients as well. I actually think that a keto diet can be one of the most satisfying diets out there. I mean I’ve noticed in working with patients over the years that when they follow a keto diet the right way, they start to say, “Man, I can’t believe how full I am. I can’t believe my cravings are completely gone now.”

That’s one of the things that sabotages a lot of people. But what helps people get rid of cravings is the combination of fat, fiber, protein and certain phytonutrients and antioxidants that help balance blood glucose levels, like cinnamon and rosemary and turmeric are really beneficial in that way.

And also getting more probiotics in sour foods actually also start to build up good bacteria, get rid of the yeast; it’s yeast and Candida. When people have overgrowth in their body that causes them to have these ferocious hunger cravings that a lot of times causes them to crash and burn on any type of diet.

I think the thing people need to remember too is the keto diet is a longer form of fasting just like you are going to fast maybe anywhere from three days and not intermittent fasting; a true long-term fast. You know you can fast anywhere from three to 40 days. For most people that are going to do the keto it’s going to be about 30 to 90 days so this isn’t going to be a forever diet. Think of it as a long-term fast or a long-term cleanse that can be done multiple times of the year.

But then people are going to move into more of a diet where they’re
going add in a small amount of those healthy carbs maybe go from 30 grams a day to 90 grams a day, triple that. And there can add things like a sprouted grain rice, some quinoa, some oats, maybe a sweet potato, more things like squash, extra fruit, those sort of healthy carbs they can add back in. People can benefit from fasting. People can benefit in a big way from doing the keto diet.

**Dr. Perlmutter:** One thing we know that being on a ketogenic diet does, and you mentioned beta-hydroxybutyrate very important as one of the ketones, is it reduced inflammation. We know that inflammation as a mechanism antagonizes the insulin receptor making it less functional.

So it may very well be through that activity that beta-hydroxybutyrate is helpful in improving sensitivity to insulin. But beyond that, beta-hydroxybutyrate in of itself is a powerful brain fuel that augments the brain’s ability to create these energy molecules that we call ATP, while at the same time reducing the production of damaging chemicals that we call free radicals. So you’re getting more bank for the buck with less damage, who doesn’t want that?

We also understand that beta-hydroxybutyrate acts a cell signaling mechanism. What does that mean? It changes gene expression within each and every cell in your body and this plays a very important role in the brain because it’s able to amplify the gene production of various types of chemicals that are really good for us; for example one called, BDNF, brain-derived neurotrophic factor. So being on a ketogenic diet is another way, because it turns on this gene to make BDNF that leads to the growth of new brain cells and also leads to the brain having a better ability to form new connections, a process that we call neuroplasticity.

**Dr. Mowll:** Some argue that the low-carb ketogenic dietary approach is difficult to follow and therefore compliance to this therapy is low. In direct contrast though, in the Hallberg study, the authors reported that 83% of the participants remained in the study at one year. That’s almost unheard of.

**Maria:** It’s all about oxidative priority and how our body preferentiates different proteins, you know, proteins, carbs, fat. And how if you really want to lose weight, keto is great for so many things and I started out with that. But if you want to lose weight which 99% of the whole world wants to do and that’s why they venture into this whole keto lifestyle, if your body is already high fat, you don’t need to be adding a ton of it.

And it’s so interesting because I get kicked off of Facebook groups and stuff all the time because I’m trying to educate people on how to actually lose weight. And they’re like, “Too much protein turns into the sugar.” And I was like, “Chicken is not chocolate cake.” We need to separate the two. It’s a demand driven process and if you actually have type 1 or type
2 diabetes your protein need is higher than what you think it is.

You want to hit at least point 8 times your lean mass that's not 300 grams of protein. I'm not saying like the body builder idea. This is a really decent, point 8 times your lean mass on average it's like 80 grams for a female, it's not a huge amount. But most women are doing Bulletproof coffee, and fat bombs and egg fast. If you do an egg fast you're never going to hit your protein goal, that's like 24 eggs. That's where the whole carnivore idea comes into play. You don't need to add more fat into it. A chicken breast is a ketogenic diet. You don't have to have the chicken thighs like all of these like people think. You can't have chicken breasts, it's not keto. It's like, who said it's not keto?

If you keep your carbs low enough, you hit your protein goal, you will be in ketosis. Fat is to help keep you satiated, it's help with fertility.

Again, if your goals are different, that's a whole other ball game. You still want to hit your protein goal because no one wants to lose their hair, nobody wants a low thyroid, any of that. You need all of these amino acids for your thyroid function, your hair follicles, your nail follicles, if they're brittle and all of that think about your protein goal.

And so the fat is the gravy that goes on top. You don't have to add it, but it adds flavor, it adds texture, vitamins A, D, E and K. Those are fat soluble vitamins. Don't take your vitamin D without food, right? Those are all fat soluble. You need fat for hormone health and all of that. I'm not saying no fat. I'm just saying you don't need to drink butter in your coffee, never have I ever done that. I don't actually do any caffeine either. You don't need to add a bunch of sauce on anything. I love sauce but it doesn't have to be added in order to be in ketosis.

I love delicious tasty food. I just want people to realize, you don't need to add butter to your steak, the steak is enough. Gram for gram when it comes to calories, protein is the most satiating food. When you sit and put protein on your plate wait to eat the fats. Because if you add the fats first, then you're never going to be able to finish that protein because you're just too full with calories.

But if you just focus on the protein, even that much, people are like, “I'm so full,” and it's only like 800 calories of protein. But it's really powerful way of eating to lose weight first and that's what most people are looking for. And the reason why I'm putting this out there is, I get so sad when people are like, “I tried keto and I gained like 10 pounds.” And I was like, “But you're reading all the bad information.” I used to be the crazy lady out there and now that keto is an Uber popular, it's a blessing and a curse. If you do it properly it's amazing.

**Dr. Mowll:** Next let's look at fasting. Fasting is one of the world's oldest
healing strategies. According to an article on the history of fasting by Cherrill Hicks, “Hippocrates, the father of western medicine, believed fasting enabled the body to heal itself. Paracelsus another great healer in the western tradition wrote 500 years ago that fasting is the greatest remedy; the physician within.” Ayurvedic medicine has long advocated fasting as a major treatment. In ancient Greece Pythagoras was among many who extolled its virtues.

**Dr. Fung:** So it’s really a very simple concept, is that you’re letting your body use up that excess sugar. So if you don’t eat, your blood sugars will drop, everybody understands that. And so it’s like, if that’s true, then why can’t we use it instead of drugs? So instead of putting somebody on a drug, why can’t we say, “Okay, let your body simply fast.”

So your body is going to need your source of energy. First source of energy it’s going to turn to is all that sugar that’s in the blood. That’s the most easily accessible, that’s what energy is, it’s going to use it. All of a sudden you’ve used up all the excess sugar in the blood, why do you need to take this drug? So now all of a sudden as you do it more and more, you’re going to start to lose weight.

As you lose weight, the diabetes goes away, now you’re turning that diabetes in reverse because you’re burning off all of that sugar therefore the diabetes is getting better. You’re losing weight which means that you don’t need the drug and then you’re reversing your disease. And that’s what we really want people to understand, that this is a reversible disease and that the power to reverse it does not lie in the drugs that you give.

It’s a dietary disease so therefore you need a dietary solution and that means it’s in your own hands. You have the power to make yourself better. You can simply not eat and allow your body, because remember your brain, your kidneys, your heart; they all need a source of energy.

And if you don’t eat, it’s going to have to pull it from your own body. And the first place is that sugar and then also all that fat in the liver, it’s going to pull it out. But generally short or fast are done more frequently. And there’s nothing to stop people from starting with 16 going to 20, 24 that kind of thing and then sort of moving up from there if they need to. So there are people who do very well with say a 24 hour fast, two to three times a week.

And they will reverse their diabetes with that and it’s like if that works for you, great, other people won’t. Then maybe you need to push it a little bit more or you need to give it a little bit more time. Or you need to watch the diet in-between because it’s a push and pull because when you’re eating, if you’re eating a lot of junk food and carbohydrates, you’re putting a lot of sugar into that sugar bowl, so even though you’re
letting it burn off a little bit, you’re still putting a lot in. So therefore then you have to fix the diet as well. So there’s lots of different ways and everybody reacts differently. So it’s important to sort of find what works for you.

**Dr. Mowll:** Intermittent and continuous fasting have been shown to reduce circulating insulin levels which is beneficial in reversing insulin resistance, increase fatty acid oxidation and fat burning, improve weight loss and balance many of the hormones associated with hunger, weight and blood sugar management.

For example, one study published in the *International Journal of Obesity*, compared intermittent and continuous fasting and found that, “Both approaches achieved comparable weight loss and improvements in a number of risk markers for cancer, diabetes and cardiovascular disease. For example, reductions in fasting insulin, insulin resistance, leptin, leptin adiponectin ratio, free androgen index, inflammatory markers, lipids, and blood pressure.”

Another study in the *World Journal of Diabetes* found, “Short-term daily intermittent fasting may be a safe tolerable, dietary intervention in type 2 diabetes patients that may improve key outcomes including body weight, fasting glucose and postprandial glucose variability.”

Kidney specialists and fasting for diabetes advocate, Doctor Jason Fung, simplifies it with this statement, fasting is the simplest and fastest method to force your body to burn sugar for energy. Glucose in the blood is the most easily accessible source of energy for the body. Fasting is merely the flipside of eating. If you’re not eating you’re fasting. When you eat your body stores food energy, when you fast your body burns food energy. If you simply lengthen out your periods of fasting, you can burn off the stored sugar.

If you’re using insulin or insulin stimulating drugs like the secretagogues that I mentioned in module 5, it’s important to discuss any type of fasting strategy with your prescribing physician. Otherwise, intermittent fasting is generally recognized as a safe and effective way of lowering blood sugar, improving insulin signaling, increasing fat burning, and reducing body weight.

Longer term or continuous fasting strategies for people with diabetes should always be supervised by a physician or a qualified clinician. Next, let’s look at low calorie diets and the fasting mimicking diet. Similar to fasting is a strategy using short or long-term calorie restriction to minimize energy intake and maximize net energy utilization.

A review article in *Molecular Aspects of Medicine* states, “Restricting the intake of calories has been practiced as a method for increasing both
the length and quality of life for over 500 years.” They went on to say that animal studies on calorie restrictions have shown, “Profound impacts on age related diseases including reduced risk for cancer, neurodegenerative disorders, autoimmune diseases, cardiovascular disease, and type 2 diabetes mellitus.” Research done at Newcastle University by Doctor Roy Taylor, put a group of type 2 diabetics on a 600 calorie diet for eight weeks and reported, “Normalization of both beta cell function and hepatic insulin sensitivity in type 2 diabetes was achieved by dietary energy restriction alone.”

More recently Doctor Valter Longo has published data on the fasting mimicking diet. In this diet, for five days each month, you eat a restricted calorie diet of around 500 to 700 calories per day. His study from Cell journal showed that this type of calorie restriction diet had profound effects on the insulin producing cells in mice. It was able to, “Restore insulin secretion and glucose homeostasis in both type 2 and type 1 diabetes.”

And in a human trial, he reported in Science Translational Medicine, participants did three monthly cycles of the fasting mimicking diet and the authors concluded that the diet was, “Feasible, safe and effective in reducing body weight, waist circumference and BMI, absolute total body and trunk fat, systolic blood pressure, as well as IGF-1.” In addition, it reduced blood pressure, fasting glucose, triglycerides, CRP and cholesterol in test subjects.

Robyn: It’s not new to know that fasting for an extended period of time anywhere from a few days to a month or more is incredibly regenerative for the human body because the body doesn’t have to spend 65% of its energy metabolizing food, which is what we do every day. But when we give our body a break from that it quickly shifts into rest, rebuild, repair modes. One of the most important elements of that and I think it should be in everyone’s vocabulary especially people with blood sugar issues and diabetes, is autophagy.

And autophagy or you might see it spelled autophagy is what it looks like, really what it means is self-eating. And what happens is, when the body is given some time and space and doesn't have to be metabolizing food constantly, just constant input of fuel, it can shift into breaking down the bad guys, breaking down the broken parts, breaking down the old parts, tearing down things like cancerous growths.

And I’m sure people are watching this going, “Well, I don’t have cancer.” Yes you do. Everybody has cancer. We have 50,000 cells a day that are mutating. We cannot be bombarded with the GMO foods and the chemicals, the round up that all of us have in our bodies at this point. We have 80,000 chemicals approved for use in our air, water, food. This has never happened before in the history of human beings and it makes
it that much harder for people to fast. Thousands of years people fasted for spiritual reasons, for physical purification reasons.

Now, people struggle to fast. And some of the researchers in fasting not only say that fasting is one of the best things that diabetics can do, they also say diabetics should not fast unless they're under the care of a practitioner especially with the medication issues. There's medications you shouldn't be taking when you're not eating any food for days at a time.

So like you, I've done my own experimenting with fasting and in the last 25 years I've done seven different fasts, where I ate no food anywhere from seven days to 20 days. So I've done that seven times. It's very difficult. I'm not able to carry on with my life. I'm a competitive athlete, I can't play sports, I'm mostly sitting in my bed trying to work and mostly my brain isn't entirely functioning. Or I might go for a short walk during the day or just watching Netflix.

And so when I'm going to do a seven day fast because I know it's the very best thing I could possibly ever do for my health, I think the evidence is clear on that, it's like I have to take vacation days. I don't want to spend my vacation days sitting in some Ash Room or water fasting clinic eating nothing because I can't do it at home. The fridge is there and I've no willpower, can't do it. Some people can.

But what's so exciting for me as a researcher, I think it's the most exciting thing I've discovered in this century so far. It turns out that major research institutions like USC and Johns Hopkins are finding that you can do a modified fast. You can eat up to 800 calories of organic plant-based meals spread out throughout the day.

And I've developed a program for it, where for a very inexpensively you can eat five mini meals a day and you are achieving all of the same benefits of fasting. I could not have possibly known that had there not been these researchers who did these clinical trials. And I think that's super exciting. So now I'm doing a modified fast for the first three days of every month and I'm eating only these five specific mini meals that are keeping my diet very clean. And I'm achieving benefits like everybody that we've put on it; 100% of the say inflammation, disappearing like achy joints gone.

And we've had people who, they've lost anywhere from 3 to 6.4 pounds, all of our flash faster so far. And the ones who lose 6.4 pounds say of course there's some water weight in that. But the thing is about water weight, people think that's not important weight to lose.

Well, let me tell you what water weight is when you eat it; totally anti-inflammatory modified fasting diet, where you're eating small amounts
of food within a window and letting your body do the repair work in the rest of the 16 hours a day, is that as inflammation heals, there's trillions of inflamed cells that heal and release dirty fluids. That's what the water weight is. So that's not a bad thing to lose either.

It's like Doctor Longo talks about the metaphor of what if you're on a wood burning fuel train? You're on train and there's a wood burning stove in the car that makes the train get to its destination. Well, what if you're going to run out of fuel before you get to the station? Well, you're going to tear down some of the oldest benches and throw them in the wood burning stove.

Well, when you get to the station, you got to rebuild the seats that you tore out. And so what are you going to rebuild it with? That refeeding process is also key in your healing, if you're looking to avoid diabetes or if you're looking to reverse diabetes. And so you don't just three days later, just drink a bottle of wine. You three days later continue on with a healthy diet, that's important too. So that what you rebuild the broken parts from, is quality ingredients.

**Dr. Mowll:** As with fasting it's important to practice caution with calorie restriction especially if using insulin or medications that cause the release of insulin from the pancreas. Be sure to discuss this with your doctor before making any significant dietary changes.

**Dr. Hallberg:** So there are three clinically proven ways to reverse type 2 diabetes that's with bariatric surgery, a very-low-calorie diet and a low-carbohydrate diet. And so who should be making the choice about what people should be doing? There's only one answer to that and that's the patients themselves. And therefore, it becomes the responsibility of healthcare providers to understand all three possibilities and be able to have a intelligent discussion, patient-centered discussion with everyone that they see.

So some patients may not even choose to go after reversal, but again that's their choice. But they will never choose reversal unless they know it's an option. So it's again healthcare providers' responsibility to understand that it can be done and then to really be able to discuss the options with their patients.

Now, I've chosen to utilize a low-carbohydrate method. And I do that because I think that the fact that there is not calorie restriction, the fact that people get help with their hunger and cravings and people find it more sustainable, and it's very effective. And so I think most people will choose a low-carbohydrate model, but I said most and not all. And again, patient choice is key.

**Dr. Mowll:** Each of these strategies has helped hundreds if not
thousands of people with diabetes and blood sugar problems improve their health and regain control of their blood sugar. If you feel drawn to one of these eating strategies, make sure you discuss it with your diabetes care team including your doctor and diabetes coach, to make sure it’s a good fit for you. Then make a commitment to strictly follow it for at least 30 days. Anything less than that is probably not adequate to see significant results.

Lily: With mothers you can have a higher risk of a number of other pregnancy complications that are related such as preeclampsia or requiring a C-section, gaining an excessive amount of weight during pregnancy, just generally being more uncomfortable. For a baby we see that there can be epigenetic effects meaning like the way that their genes express and how that affects their future risk of disease can be negatively impacted by maternal high blood sugar and pregnancy.

So we see higher risk of type 2 diabetes and obesity specifically in children of women who had poorly controlled blood sugar and pregnancy. So it is important to maintain blood sugar at normal levels. I think diet therapy should be the first line approach and really giving women the confidence to monitor their blood sugar, see which foods are making it high, minimize eating the foods that are making it high, but still eating adequate amounts of food and calories in total is really the best approach. And then if needed you can go to adding additional medication or insulin as required to manage blood sugar. Not everyone can do it with diet alone. But we’ve got to do the diet part first.

If you embrace a lower glycemic, lower carbohydrate, eating to the meter kind of approach to gestational diabetes, you see the chances of a woman requiring insulin or medication drop by about 50%. So you can definitely reduce your odds. Notice that didn’t drop to zero, so there’s always going to be some people who come into pregnancy with preexisting insulin resistance or for whatever reason maybe their pancreas is not adapting as expected during pregnancy and is not producing the amount of insulin required to maintain normal blood sugar.

Those are the cases where insulin or medication is a really necessary tool. For me it’s always an adjunct on top of working on the food component because you can minimize the dosage required by controlling with food. So if you think about the macronutrient that is most linked to high blood sugar is carbohydrates. If you eat a lot of carbohydrates, you might be requiring double or triple the amount of insulin than if you were eating lower carbohydrate.

And which would you rather choose? They’re both acceptable approaches, assuming your blood sugar stays well controlled, but the big challenge is as you eat really high-carb and then treat with high
amounts of insulin, you also have a risk of overdosing at different
times or sort of an unpredictable response to insulin where you might
go hypoglycemic and that carries its own risks. The nice thing about
low-carb is that naturally kind of mitigates the highs and lows so your
rollercoaster of blood sugar is a lot more gentle. And then the amount of
medication or insulin needed to treat is a lot lower and thus your risk of
hypoglycemia is very slim.

So the concern that we're going low-carb in pregnancy originates
from our dietary guidelines which suggest that there's this mandatory
minimum amount of carbohydrates required for pregnancy of 175
grams per day. It turns out that that's not actually the most evidence
based number when you go and look at how that number was created
and where they came up with it.

The big concern that most clinicians will voice is that they think that if a
woman goes low-carb, she might go into ketosis. But ketosis from going
low-carb is a low level nutritional ketosis that pretty much all pregnant
women are going to go in and out of their ketosis throughout their
pregnancy. It's really not a concern. Where you start getting concern
about ketosis is if a woman is not eating enough food, so if she's starving
herself that is not good.

We don't want to be in ketosis because your body is burning your
stored body fat for fuel because you're under eating, that's not good.
We also don't want to be in ketosis if somebody has preexisting type 1
or type 2 diabetes and requires insulin and is not taking enough of their
insulin. Then you can go into a really dangerous state called diabetic
ketoacidosis.

That's no good, but for a pregnant woman who doesn't have those
preexisting complications they're not going to go into DKA. If they slip
into ketosis and they're eating adequate amounts of food, it's going
to be at very low levels. And they can monitor this actually with blood
ketone levels to confirm that it's not too high. I've actually never had
a client test too high for blood ketones when they're following a low-
carbohydrate diet.

Dr. Mowll: Do your homework. Get all the information you need
including examples of an eating plan, helpful recipes and the action
steps you need to take to adopt the strategy; then make a firm
commitment. Let your supporting care team know what you’re doing
and go for it. As long as your doctor gives you the go ahead, none of
these eating styles is dangerous to your health or your condition. They
do, however, all require some willpower and commitment to learn, make
necessary adjustments, and to be able to follow the particular plan.
Lastly, I don't necessarily recommend using any of these methods as a
long-term permanent eating approach.
Although, some people certainly choose to do that and are successful, many find it preferable to use these strategies therapeutically to achieve results and achieve their goals. Then they will transition to a stable long-term maintenance program for optimal blood sugar control and long-term health. In my next and last module, I’ll be sharing some tips and insights to help you stay motivated for success and avoiding diabetes burnout. This is Doctor Brian Mowll, the diabetes coach and I’ll see you next time for module 10.

Unlike certain conditions and diseases like a strain/sprain or a broken or cold, flu, or infection, diabetes and blood sugar problems will never really go away. Now before you get too upset with me or start to feel hopeless, hear me out here for a minute. Even the clients with pre-diabetes and type II diabetes, that I have helped to reverse their condition or put it in remission, must always be aware of their blood sugar, what they’re eating and how they’re living.

As soon as you let your guard down, just a little bit too much, diabetes can come roaring back to bite you. The truth is that diabetes is challenging and there is just no way around that one. And while that may all sound a bit depressing, there is some good news here as well and here it is. If handled properly, you can live a long, healthy, high quality life even if you have diabetes and blood sugar problems. Many people have lived for 80+ or more years with diabetes and never developed a complication or had any lasting problems because they were able to maintain good blood sugar control.

One of my mentors, Dr. Richard Bernstein, was diagnosed with type I diabetes when he was just 12 years old. He described how he lived as an ordinary diabetic for two decades following his doctor’s orders.
Unfortunately, following this advice kept his blood sugar too high and he developed several complications.

After finding one of the first blood glucose monitors and spending the time to test different foods and track his blood sugar. He started using a low carbohydrate diet and an insulin regimen that allowed him to keep his blood sugar in a very tight normal range. Using this strategy and an added exercise program, he was able to improve his health drastically and reverse the diabetes complications. In an effort to share his success, he went to medical school at the age of 45 and committed his life to helping people with diabetes. He is now in his mid-80s and thriving with enviable health and no complications.

Compared to cancer, stoke, heart and vascular disease, Alzheimer's or Parkinson's, and other common health problems, the good news, as Dr. Bernstein demonstrates, is that diabetes can be completely controlled, and you can virtually eliminate your risk of problems with the right approach. The key is to realize that this is a lifelong process and will be a battle at times, but it's a battle that you can win.

My name is Dr. Brian Mowll, the Diabetes Coach. I am a certified and master licensed diabetes educator and IFM certified functional medicine practitioner. Much of this success comes back to your core motivation. Your big why. The idea or belief that is driving you to focus on your blood sugar and health. The vision for your life that is really important to you which defines how good health, independence and freedom from diabetes contribute to the quality of your life.

Whenever you are feeling tired or unmotivated, think of your big why. Anchor back to your core motivation and stay focused on your goals and on your vision for your health and life. I have found that my clients who can do this consistently, who can stay focused on the ultimate outcomes that they want to achieve and the reasons which undergird their desire to achieve them, always do the best. They are able to weather the storms. There will be still be storms of course, but they are able to get through them without jumping or abandoning ship.

Razi Berry: Who you are now right, what you are feeling and experiencing right now, is just an accumulation of what you said and did and ate the day before and the day before and the day before that. So, the beautiful thing about it is this message right now, you can listen to what that message is, and you can make that change right now and tomorrow you will be a little bit more healed and the day after that and the day after that just by those little acts of loving yourself.

Taking this master class and learning from all these experts is an act of self-love. And it is empowering because I'm sure many people watching us right now, Brian, have gone to someone about their blood sugar and
they are just given a prescription and it doesn’t address like, “How are you feeling about having this diabetes? What do you feel empowered that you can change? Where do you feel stuck?” And this master class really gives people those answers.

**Dr. Mowll:** That’s what I want for you. We talked in an earlier lesson about goal setting. We discussed making short and long-term smart goals that are specific, realistic and relevant to you.

**SMART GOALS:**
S – **Specific** – write out clear, concise goals.
M – **Measurable** – the ability to track your progress.
A – **Achievable** – set challenging, yet achievable goals.
R – **Relevant** – set goals that are relevant to your overall life plan.
T – **Timely** – goal has a target finish time attached.

As we start to look at long term blood sugar control and diabetes management, it is important to continually update your goals so that your current goals are still relevant to you. I like to help my clients set 30- and 90-day goals and update those goals at those specific end points. 30-day goals tend to be more action-oriented goals, such as exercise 5 times/week at least 20 minutes per session or eat no more than 50 grams of net carbs per day six days per week for the next 30 days.

Whereas 90-day goals tend to be more outcome-oriented goals, such as I want to lose 10 pounds over the next 90 days or reduce my blood glucose levels by an average of 20 points in the next 90 days. These two types of goals are both measurable and time-based but require a different type of focus to achieve them.

Again, it is most important that these are your goals relevant to you and to your current situation rather than something that your doctor, coach or medical organization deems imperative for you. Diabetes fatigue or burnout can strike anyone and it’s essential to safeguard against it and use strategies to help you stay motivated toward your health vision.

In one article, licensed psychologist, Frank Sileo, PhD, discusses diabetes burnout and shares some helpful strategies. First, it is important to know what to look for. There are several telling signs of diabetes burnout including emotional exhaustion, social withdrawal, decline in physical or mental activity level or performance, negligence about your diabetes care including blood sugar monitoring. If you find yourself in this situation, there are a few things that you can do. First, get help with your daily activities. Ask a friend to help you engage in your physical activity. Get a family member to remind you to check your blood sugar or go to your appointments. Join a group that has similar responsibilities that can help keep you accountable.
Next, accept your feelings. Know that it is OK to feel this way. Frustration, anger, and sadness are normal emotions and we'll all experience these at times. Instead of hiding your feelings, share them with a friend, a family member, therapist, or group who can offer you positive support. Next, learn to say know, especially if you are feeling overwhelmed. You don't need to do everything. It is important to know yourself and say no when it is healthier for you to pass.

Life is cyclical and there will be times ahead when you are eager and ready for new tasks and more responsibility. Taking on too much at the wrong time can make you withdraw even more. Next, identify what you can and cannot change. There are certain things that are within your control and some that are just not. You have diabetes and you can't control your genes or your past, but you can control what you do now. Focus on that.

Developing healthy coping strategies for the diabetes battle is critical for long-term health success. One of these coping strategies is preventing self-sabotage or relapse. We're all human and, as such, have a tendency to sabotage ourselves. Sometimes it happens when things are going really well. We can get complacent and lose the motivation to continue the actions that led to our good results. In others, frustration with slow progress and or fluctuating blood sugar or weight can lead to rebellious behavior.

While self-sabotage is normal and should even be expected, it's also dangerous and can lead to a loss of momentum and progress and sometimes cause our health and blood sugar to spiral out of control quickly. The best way to prevent and address this is to know yourself. Identify your self-saboteur so that you can overcome the desire to self-sabotage when it rises.

**Niki Gratrix:** It's also interesting like personality traits as well. It is very interesting like early life stress in adults, when we have trauma, we have a state that develops, and the state is temporary. In childhood, the states become traits and they become biological fate. Yeah, so it becomes much more programmed in.

And we're looking at traits like – and we've all got them to some degree – but things like kind of constant overachieving or constant over giving. So, it can be also over giver where we never prioritize our own needs. Things like, we know we are kind of an anxiety type or a perfectionist and a lot of that is all making up from when we didn't get this early sense of – basically it is about love. It is about unconditional self-love and it is not taught in society.

And I would probably say that more than 80% of us do not get taught that, about self-love. So, what we do is we make up for it. So, if I don't
feel, at my core, OK, I will make up for it by achieving or creating a huge amount of external status that validates that I'm OK. Or, if I just get everything right, I will be OK.

And it's just the message we got from parents. We got overly criticized, we took it to our core existence, our identities. We're not acceptable unless we do everything right, achieve or give to everybody or worry about every single thing that happens. So, there's actually a personality typing system that I use that is widely available called the Enneagram, which is a 9-personality typing system. And it's actually the type 1 perfectionist, type 2 givers, type 3 achievers, and type 6, they are called the loyal types, but they're anxiety types.

And it's good, just another tool for people that's widely available on the internet. And it's good fun as well, it doesn't have to be heavy, but you can just start to look at what types of traits that you might have and that's where the sabotage comes in because that's where people don't stick to health programs and protocols because they find themselves just not being able to stick to it. It's like they are choosing consciously one thing and their body does something else. And it is often these core unconscious core traits that are driving behavior and, actually, what it comes down to a self-love deficit from not getting enough love as children and a lot of us have got it.

So, you start identifying the patterns, that helps, the awareness is half of it. So you can resolve, just by becoming aware of your traits, they can start to alchemize. Then when you are, it's this knack of learning, when you do see yourself sabotage or you see these traits, or you see things that may have gone wrong and you sense that that's got in your brain, learning that you also need to have total self-acceptance, non-judgmental self-love.

That's where it starts, start there. We can become judgmental about the fact that we notice that we are a judgmental person. That's not breaking the spiral. Somewhere you've got to start just being able to get that knack. So that's some of the basics that people can do just to start to explore.

**Dr. Mowll:** There are five different types of self-saboteur that seem to affect most of us. First is the ostrich. If you are an ostrich, you choose to keep your head buried in the sand about the challenges you are facing with your health and with your blood sugar. Instead of taking action, you tend to ignore the problem and hope that somehow it will go away on its own. The solution for this is to pull your head out of the sand and address the situation head on.

Next is the achiever. That is someone who feels that they are just too busy to dedicate adequate time to their health. If you are an achiever,
you may prioritize other things, such as work, family, projects, and other activities above your health. The idea of cooking and preparing meals, studying, tracking blood sugar, meditating, and physical activity may seem too daunting considering all of the other responsibilities.

Here the solution is to make your health a top priority. Focus your energy on achieving your health goals by reading a book or engaging in a program like this. Use a tracking app to track your food, blood sugar, weight, exercise and progress. Make your health your most important project.

Next is the epicurean. The epicurean is a lover of life, the foody, or the one who says life is just not worth living if I can't have my...whatever it is. There is an underlying sense of deprivation when eliminating certain foods, drinks, or other behaviors. While there is nothing wrong with loving food and enjoying life, the epicurean uses those desires as an excuse to sacrifice their health. The solution for the epicurean is not to fight that inner foody but to embrace it. Find healthy restaurants, fun low-carb recipes that taste delicious, and turn your health into an inspiring journey into new and fantastic foods.

One of the most common self-saboteur patterns is the inner rebel. Here you feel a dark pull against doing what you know is best or right in favor of acting out or experiencing the freedom to do whatever you wish. The inner rebel wants to eat a cookie just because they are not supposed to do it or because they know it is not supportive to their highest health goals.

Often you will find yourself justifying unproductive behaviors with phrases like, “I deserve it. Everything is OK in moderation. Everybody else does it so why can’t I?” and other self-defeating mantras. The solution for the inner rebel is to feed yourself in other ways. Start a new hobby or activity, travel, explore new ideas, read an exciting book. The inner rebel wants to be engaged and stimulated. Find healthy ways to do this.

Last is the conformist who is often more concerned about how others feel than about their own health. Here you find yourself not wanting to offend your host by skipping part of a meal or not wanting to be nuisance at the restaurant by asking the waiter about ingredients. Ultimately, the conformist is motivated more by social pressure and following norms than by their own inner desire to get healthy.

For the conformist, it's important to see your health as more important than the discomfort that you might feel when sharing your dietary preferences. Use strategies to avoid conflict by bringing your own dish or suggesting your favorite healthy restaurant. Host the holiday dinner yourself rather than attending an occasion at someone else's home. And
don't feel like you have to share your whole story. Rehearse saying, “No thank you!” over and over until you feel comfortable with it.

Whichever saboteur you related to the most, realize that these are all destructive behavior patterns that will ultimately interfere with your best health intentions. Try to identify that inner saboteur so that you can appropriately deal with the root issue and create a more empowering outcome for yourself.

**Melissa Kathryn:** I always say, where there’s lack, you will fill the gaps with food. So, my entire approach to the way that we eat is the way that we eat, I believe, dictates the way that we do many things in life. Because the way that we eat, you're not eating the way you’re eating because you are oh so happy with all these areas in your life, right. We are filling gaps, and these have become coping mechanisms. Ways of dealing with life that support us, that we learned in earlier times in life of, “Oh, I actually didn't have the skillset to be able to deal with the loss of this family member. So, instead, I ended up eating.”

So, every time I get triggered with that, this is my response. And, when I get stressed out at 4:00 in the afternoon or at night when all the kids go to bed, my way of relaxing and giving back to me is food. So, there's these different things in place, so when we start to identify those gaps, we are looking at a whole approach to life. Because I believe food is medicine and really looking at how can we eat to facilitate and nourish my life, my beliefs, and my desires and my goals for my health and my body.

I will ask my clients, I will say, “So, in what ways are you getting in the way of these goals. So, now that we have mapped out your goals, now that we have identified your gaps, what ways do you get in the way?” “Well, I don’t know.” And then it’s, “I’m not getting enough sleep. I am stressed out. There is so much on my plate. Everything is expected of me. I am at the bottom of my list. I am not taking time for me. I’m not prepping food. I don't have healthy things on hand. I’m just grabbing things. I am eating whatever my kids have. I am just grabbing stuff.”

And then we start to see, OK, these here are actual just action steps. We haven't even gotten into the mental game. Now we are just looking at what are like practical things that we can just make a list of and then make the opposite. OK, I’m eating my kids’ food so what would support you. I am going to prep and have healthy things on hand.

Then I look at where did we create these coping mechanisms with food because there is always a root cause. We don’t just always want to be sabotaging ourselves. We are not setting out going, “Hey, I really would love to get this 5 up to 60 or 80 or more pounds off. My blood sugar is dropping --.” Like what are these things that are going on?
There are other things at play, so we look at like the medical, right? Then we are also looking at when did we start to use food to cope. When did food become our friend? I really encourage people, it makes you understand you a lot better when we start to look at food and human connection and no longer as a substance because food is really a substance, but many of us use food to soothe and to have a response and connection much like a human connection.

**Dr. Mowll:** If you find yourself the victim of a relapse or self-sabotage, the AADE [American Association of Diabetes Educators] has several recommended strategies to move past it and get back on track quickly. The first is to practice self-forgiveness. Dwelling on feelings of failure, guilt, and worthlessness is not productive and can lead to an all-out relapse. Instead, evaluate the links in the behavior chain and work on how to address and avoid the triggers in the future.

**Jonathan Bailor:** The most surprising thing I have seen in the past, I would say, four years of really working deeply to help people to reverse this deadly disease, is a lot of people think it is a food problem. I would characterize it more as a shame and self-worth problem. And what I mean by that is, yes, there is no question that our dietary choices have a tremendous, almost, dare I say, causal effect on the development of this disease but what’s driving our food choices?

And we live in a culture of never enough. You are never good enough. You are never smart enough. You are never strong enough. You are never skinny enough. You are never successful enough. And you are not making enough money. And it applies equally to men as to women.

We then find that we need some way to numb that pain. Nowadays, we are seeing people numbing it with the opioid epidemic, or they numb it with sex, or they numb it with workaholism, or they numb it with alcohol, or, most commonly, they numb it with processed sugars, starches, and fats. So, they are using processed sugars, starches, and fats as a way to deal with this underlying sense of, “I’m not enough. I am not high quality.”

The irony here is that, first, if we can change our mindsets to really understand that, I promise, you are not low quality. You ARE high quality. You have the capability to transform lives. You are high quality. Once you get that, once you get that you have nothing to be ashamed of, then eating high quality food, which is a key treatment for this disease, becomes radically easier. Because you know you’re high quality and, therefore, you deserve high quality.

This was a recent breakthrough that we made on my team and that was to reframe the diabetes diagnosis. This is new, so I may not nail it. This is cutting edge but, for example, even the language we use – so, if you
find out, for example, there is a lump on your breast and the doctor says, “This is cancer and it’s serious and we need to fight this and we can BEAT IT.” That’s the language we use with a cancer diagnosis. This is a problem, YOU’RE not a problem, THIS is a problem. And we need to fight this, and we CAN beat it. They don’t talk about managing your cancer, they talk about beating your cancer because you can. I am here to tell you strongly; you can beat diabetes.

You can fight diabetes and you’re worth fighting for. I know you’ve seen this, “I’m on metformin. Within months I am not on metformin anymore.” And we can’t say cure. I’m not going to say cure, but I am going to say, you were on medication for a medical condition and you are no longer on medication for a medical condition. And that can happen in months and it can happen without any whacky stuff. It happens by treating yourself as the high quality being that you are.

**Dr. Mowll:** Next is to practice positive self-talk using affirmations. Make reassuring statements to yourself, such as, “I can accomplish anything I set my mind to and today I make healthy choices.” You can find more examples of these affirmations online. It is important to focus less on the past failure and more on future success and on your plan to get back on track. Learn from your past mistakes. Then let go of the feelings around that experience and step into today making healthier and more productive decisions.

**Niki Gratrix:** The good news is, that we haven’t covered, but the good news is everything we said about the brain gets kind of wired for stress and the epigenetic shift, that can be reversed. That can absolutely be reversed. It is just that these positive states of feeling and also that the kind of behavior that that drives, we need to cultivate that.

So, we need to cultivate the positive states and most of us don’t. We just kind of get on life. And then we kind of don’t address the fact that to retrain the brain and to simulate the vagus nerve, which is the rest, digest, detoxify, calming, healing, lower the blood sugar, balance the blood sugar side of the autonomic nervous system.

We just need to just start to bring in practical daily kind of a certain way of life. It becomes a lifestyle and there are so many ways that we can do that as well. So, stimulating the vagus nerve on a daily basis is a really important part of this reprogram, changing the epigenetic expression. They have shown that even just one session of meditation changes the epigenetic expression of the genes, thousands of genes, just one session.

So, imagine if you do this on a daily basis. And you’ve just got to pick the things you like doing and build them into your life and when you start noticing that you’ve got the traits that are sabotaging it, bringing that to
the awareness and then bring that into self-love. Then you will slowly make these changes.

**Dr. Mowll:** Lastly, be sure to use your support network to help reinforce your commitment. Find the people that want to be on this journey with you who can provide loving encouragement and who support you becoming the best version of yourself. One of the most effective ways to avoid diabetes burnout and stay on the path to better health is to join or build this network which can help give you expert guidance, loving support and accountability.

Creating or continuing a relationship with a diabetes coach may be a wonderful idea for you or at least staying active in an in-person or online support group. There are dozens of helpful Facebook groups focusing on blood sugar, diabetes and health. Find some that are congruent with your personality and dietary approach so that you can stay engaged in your care process and get support when needed. Check online for local meet ups and listen to lectures, webinars, podcasts, and other programs so that you can continue to learn, grow your diabetes knowledge, and make adjustments to your diet and lifestyle that will contribute to your health and healing process.

**Ari Whitten:** There's been some seminal research, just in the last few years, showing that mitochondria are not just these sort of mindless energy generators in ourselves, but they're actually playing an integral role as environmental sensors. And, they can even, for example, pick up on what's going on in the environment and then direct signals back to the nucleus of the cell where our DNA is contained and control or influence gene expression, what genes get turned on or off.

There's a paper that came out a couple of years ago from a researcher at the UCSD Medical School, who has a lab for mitochondrial medicine there, called *The Cell Danger Response*. Basically, it is envisioning a new rule for mitochondria as environmental sensors that are determining whether the body goes more into energy mode or defense mode. They are actually part of the innate immune response.

So, as soon as the mitochondria pick up on things like, oh, there's lipopolysaccharide from a leaky gut or there's toxins like BPA or heavy metals leaking into the blood stream or there's an infection present or something like that, a viral or bacterial infection, the mitochondria are actually sensing that and then initiating this cell danger response and shifting the body out of energy mode into defense mode.

So, that fundamental process is what I believe is at the core of this symptom of fatigue. There's various things that can trigger it, inflammation, immune overactivation, toxins, gut problems, circadian rhythm, sleep disruption. There's chronic psychological stress. There's
actually some research that just came out in 2018 now showing that psychological stress directly impacts mitochondria and, basically, what this research did is they asked a bunch of people to give a speech.

It is kind of an interesting thing. They asked people to give a speech defending themselves from some imaginary sort of accusations. Then they measured levels of mitochondrial DNA in the blood stream. And what they found is that mitochondrial DNA is actually leaking into the blood stream, literally within minutes of this activity.

And that, essentially, what's going on is that the psychological stress creates an excessive demand on the mitochondria and part of how they respond to that stress is by leaking out some of the DNA that is contained inside of the mitochondria. When it gets into the blood stream, where it is not supposed to be floating around – you're not supposed to have mitochondrial DNA which is supposed to be inside your cells; it's not supposed to be floating around in your blood stream – once it's there, it now serves as sort of a danger signaling molecule that other cells can now pick up on and shift more into a defense mode.

There are some researchers now in this field called, mitochondrial psychobiology, that are conceptualizing mitochondrial as even upstream of things like the HPA access or the limbic system, sort of these critical stress response systems of the body.

One other point that I will mention is certainly insulin resistance and the inflammation that tends to go along with it and just the blood sugar regulation issues and the hormonal issues that go along with it can also be a trigger for shutting down the mitochondria. It can be sort of a danger signaling thing that the mitochondria are picking up on and then deciding to direct resources out of energy mode toward defense mode. That's why fatigue tends to be a very common thing in people with diabetes or insulin resistance as well.

Cassie Bjork, RD: And that's why I also discovered that there's so much more to metabolism than just food and exercise. We have got to look at all the pieces of the puzzle, your stress levels and your hormonal levels and your thyroid functions. And what supplements are you taking? And are you sleeping? And the whole picture, why does it seem to be backfiring? Like why is our nation getting sicker and fatter? It doesn't make sense. So, I became a rule breaker and I quit the low fat, low calorie diet.

So, I just stopped all that. I started eating whole real foods and I started taking care of my body by doing the right types of exercise and eating more fat. And my cravings disappeared, and my energy levels went up. I lost 20 pounds and it stayed off and I've never looked back. And I have felt more like myself again. I didn't really know what was happening
at the time. Now I know that inflammation was being reduced and my hormones were balancing out. And all of that research and my experience became the basis, the foundation, for our Rule Breakers Weight Loss Coaching Program, which looks at all the pieces of the puzzle.

Now we have been doing that for a decade and we have seen hundreds of women and men go through our program and they have tapped into new levels of energy. They have lost weight that they never thought that they were going to be able to lose and people with type 2 diabetes have come off of medications that they were told was going to have increase for the rest of their life, weight that they were told was just because of genetics or age they’ve lost. These are things that people think will never happen that are totally possible. Like we can rewrite our stories; we just have to break free of these patterns and habits and this brainwashing that has happened as the result of the big food industry and our governing boards and the sponsorships and all the shady, messy, intertwinnings that happen.

Dr. Michael Murray: I think back at people’s lives that have been changed by getting control and they need, many times, an anchor or a lever to get them to do the necessary change. I remember once I was giving a lecture in Houston, Texas, and it was on type 2 diabetes, how to prevent and treat type 2 diabetes, and this gentleman came up, he was first to ask me a question. This guy was big. He was probably 6’3” and probably 280.

He was almost in a panic. He said he had just been diagnosed and his fasting blood sugar level was like 600. His A1C was like 15.8. He was in bad shape and he just started on some medications and they really weren’t working well for him. He was really scared because he had two young children. This guy was in his 40s. He was just in a panic and he said, “Will your program work.” I said, “Absolutely. As long as you’re committed, and you comply, and you take steps.” And, within three months, he was totally cured. He went from 280 down to 210. The physical transformation reflected improved physiology inside him. His inside had changed.

One of the things that people don’t realize is how bad diabetes feels. When your blood sugar levels aren’t being controlled properly, you have more aches and pains. Your brain doesn’t work as well and your more depressed. You don’t sleep as well. You are not functioning anywhere near 100%. This guy changed his life and he felt better because of that. He is one of my favorite memories of how this program can work or how changing your life can get your blood sugar levels under control and that will really change your life.

Dr. Mowll: Remember that there is no one size fits all approach that
works for everyone with diabetes or blood sugar problems. Likewise, there is not one ongoing strategy that will help keep you engaged and motivated toward your goals. Continue to learn and grow. Stay connected with friends, family members or peers, on or offline who share common goals and who value their health like you do. And continue to anchor to your vision of the quality of life that you want to create with your intentional daily actions.

Jeffrey Bland, PhD: I really support what you're saying, and it is so great that we have people like yourself that have spent the time and extraordinary amount, I guess you would call it diligence, above and beyond expertise to develop an understanding of how important this is.

Hopefully, eventually, this will become a standard of care because this concept of lifestyle, diet, and environment plays now an irrefutably important role in determining outcome of people's health over their course of living. And we spend so little time in medical education really, as they say, if we don't test on the certification exams then people won't learn it. These questions aren't even on exams so it is like, “Well, why should I spend any time? It must not be important to learn this.”

And then we get into practice and, as you know, there can be dissolution that saying, “Oh, all these tools that I thought I was going to have that would remediate these problems, they don't all work quite as well as I thought. I'm going to have to look at these other ways to really addressing the problem.” And enlightened docs like yourself are the front edge of this personalized healthcare movement.

Dr. Mowll: I hope that you've enjoyed the Diabetes Essentials program. Stay in touch with me by visiting my website at drmowll.com, subscribing to my weekly newsletter, listening to my Mastering Blood Sugar podcast, and following me on Facebook and Instagram. Together we can beat diabetes by mastering blood sugar and optimizing health to create a high-quality life.

This is Dr. Brian Mowll, the Diabetes Coach, and I hope to see you again soon and continue this health journey with you.
Extended Interviews
Dr. Mowll: So I’m here with Doctor Vincent Pedre, author of the book *Happy Gut*. And we’re going to talk all about gut health today specifically as it relates to blood sugar and diabetes. And then hopefully we can get into actually how to create a happy gut. So, Doctor Pedre, thanks for being here with me.

Dr. Pedre: Great to be here with you.

Dr. Mowll: All right. Excellent. So let’s talk about this connection because I think it’s really important. And there are some studies demonstrating connections between gut health and blood sugar and diabetes, insulin resistance, obesity. But I don’t think most doctors are talking about it very much. So maybe what is that connection? How does gut health relate to blood sugar and diabetes?

Dr. Pedre: Absolutely. I think gut health is the missing link with metabolic syndrome and diabetes and the interconnection happens with the compromise of the gut barrier. So things like antibiotics, pesticides, toxins, even regular over the counter medications that people take every day like an Ibuprofen, these things increase the permeability of the gut barrier. So they make what we call leaky gut as the more colloquial term.

And what happens with that is that then you allow for things to get through more easily. And what’s significantly connected to diabetes
or metabolic syndrome, because all of this precedes the metabolic syndrome, then obesity, then diabetes, is a rise in lipopolysaccharide in the blood.

What is lipopolysaccharide? We call it endotoxin. It was called endotoxin because it was initially discovered as being part of the cell wall coding and gram-negative bacteria. Interestingly now, I'm learning that there is another toxin that comes from gram-positive bacteria that's called MDP or muramyl dipeptide and that also can increase inflammation in the body.

So for me now every disease is connected is inflammation and then also mitochondrial dysfunction. So lipopolysaccharide or these endotoxins they stimulate receptors in the cells that turn on a cascade of inflammation that then causes whole bunch of inflammatory issues, but we see the connection.

So studies that have looked at lipopolysaccharide levels rise and they perceive the onset of obesity and diabetes. We know there's an element of this after you eat especially if you're eating a standard American diet, that's going to cause much higher rise in lipopolysaccharide. And then there's questions about which oils to eat that might relate to that.

But the other really interesting connection here is well, with the type of bacteria that are living in the gut. And there's flora that we know is more favorable that produces these byproducts, they're called short-chain fatty acids. The primary one being butyrate which is key product because it keeps the colon cells healthy. They use it as their primary source of energy. But interestingly, butyrate also gets absorbed into the circulation and helps with insulin sensitivity and it influences gene expression.

But there is another group of bacteria, they're just discovered like in the mid early 2000s. So we didn't even know that this genus existed and it’ the Akkermansia muciniphila. And it turns that people with low Akkermansia muciniphila are going at a higher risk for diabetes and for gaining weight and metabolic syndrome. And there's something it does to keep that gut barrier healthy and it feeds off of the mucin that is secreted from the lining of the gut. So there's this really important symbiosis that is occurring there that helps us maintain blood sugar.

So then the question when you look at all this emerging research is, is metabolic syndrome, is diabetes an illness of the pancreas or is it really a gut illness? And is it starting there? And then all these other things that happen from the chronic inflammation like mitochondrial dysfunction, mitochondria being the energy centers in every cell.

And we know that there's an element of mitochondrial dysfunction
that happens in diabetes as well. Those are multipronged connections between diabetes and metabolic syndrome and the gut that all starts with maybe multiple courses of antibiotics.

**Dr. Mowll:** So let’s dive a little bit deeper into the gut health and trying to influence better gut health, a happy gut so that we don’t have this cascade of effects leading to chronic systemic inflammation which sets up mitochondrial dysfunction and insulin resistance and diabetes.

You talked about leaky gut syndrome and trying to protect the intestinal barrier system. So how do we do that from a more preventive perspective? What are some things we can do to keep the gut healthy? And then if there are some problems there, what can we do to help heal the gut so that we have a stronger barrier?

**Dr. Pedre:** Number one is diet, that is the key to a healthy gut. They actually did a study where they found that feeding people more fiber rich foods actually reduced their blood glucose and hemoglobin A1C. And it was through a mechanism of improving that butyrate production in the gut because the bacteria in the gut, the healthy bacteria feed off of the fibers which are the undigestible starches, carbohydrates in food.

So we start with diet. Diet is key. So you've got to clean out your diet and you want to make sure you’re getting enough fiber because the majority of Americans, are only getting 10 to 15 grams of fiber. But women should be at around 25 grams and above. Men should be at 35 grams and above of fibers. So everyone is not getting enough fiber.

And as a contrast to that just to put it into perspective, the Hadza of Tanzania which is one of the last hunter-gatherer societies left on the planet, they have more diverse microbiome than we do. And just thinking of the palate of foods that are eaten in the west, their diet consists of only five things. They eat animals that they catch, mostly their birds or land animals. They eat honey, but when I learned this I was like, “Are they eating honey like the way we think of it?” No, they're eating the honeycomb with the larva in it.

So they're getting the whole food. They eat berries which are very rich in fiber. They eat baobab fruit which has a nut in the middle that is high in healthy fats and high in protein. And then number one probably reason they've got such a diverse microbiome, aside from the fact that they don’t wash their hands and they kind of spread the germs amongst each other, is they eat a lot of tubers. And that's pretty much year round and tubers are super rich in fiber.

So a child in the Hadza tribe might be eating 100 grams of fiber daily whereas we’re eating 10 grams. I mean, that's a huge contrast and they don't have autoimmune disease. They don't have diabetes. So they don’t
have a lot of the diseases that we’re seeing out in the west. We have to look at that as, diet is number one, but really analyzing the fiber content of the diet is really key and then avoidance.

If you're reconstructing your microbiome, then you want to try to stay away from antibiotics, unless they're absolutely necessary. Stay away from nonsteroidal anti-inflammatories. If you've got an inflammatory condition, work with natural things like fish oil, like curcumin that help spare the gut flora and also helps spare the gut lining from damage.

And then there's nutrients that people can take if they're on a gut healing protocol like L-glutamine. But I also like talking about Quercetin a lot of people don't realize bioflavonoid like Quercetin which is a mass cell stabilizer so reduces allergy symptoms, but it also happens to be a prebiotic and helps boost some of the good bacterial counts.

And even sometimes taking in a short chain, like an illegal saccharide resistance starch to help boost the levels of the good bacteria including the Akkermansia, which have some sort of balancing effect on blood sugar. So those are some of the keys very simplified. And then you can put in probiotics but I’m a big believer in diversity in the diet and also fermented foods.

**Dr. Mowll:** For sure. That’s fascinating information. So for your typical American, what are the best sources of fiber in the diet? In other words, somebody who’s going to be able to eat a diet that is around and plentiful for us, what are some of the best fiber sources?

**Dr. Pedre:** Just number one, just starting with vegetables like salads. Like most people are eating two to three servings of vegetables every day. A serving is probably about palm size like a cup. And we should be eating at least eight to nine servings a day. So everybody is not getting enough in terms of salads.

So even including vegetables with lunch and with dinner is a really good way to start, but even just incorporating soluble fibers like oatmeal, adding flax, chia to oatmeal. Or making smoothies that have all of these ingredients, you can get a vitamin packed nutrient rich drink that you can have any time of day. But that I would say is number one and again, adding things like tubers.

So a lot of people don’t realize that tubers are very rich source of fiber. One that’s in my background because I’m Cuban so my family is from the Caribbean and one of our favorite tuber is cassava which in Spanish is called yucca. And it happens to be very rich in fiber. There’s part of it that when you’re eating it you actually just chew for a while because it's hard to break down.
And this is what they do in Africa. Like there's another root vegetable that's really tiny, they look like really tiny balls and they're called tiger nuts. And they're very rich in fiber. And what they do, sometimes they'll soak them because they're so hard but a lot of times they just put them in their mouth and they chew them over time and slowly you're breaking down the fiber and swallowing that and that helps create a healthy gut flora.

**Dr. Mowll:** Powerful information here. So thank you so much for sharing all of this. I think this was phenomenally helpful. It's Doctor Vincent Pedre and the book is *Happy Gut*. So if people want to find your book or find out more information about you and how they can create a health gut, what's the best place for them to go?

**Dr. Pedre:** They can go to happygutlife.com and if they go to happygutlife.com/gift, they can download my free book which is a quick start guide to a happy gut.

**Dr. Mowll:** Excellent. Thank you so much for being here and sharing this information.

**Dr. Pedre:** Thanks for having me.
Dr. Mowll: So I'm here today with my good friend Dr. Tom O'Bryan from theDr.com that's theDr.com. And we're going to be talking today about environmental toxins and blood sugar and diabetes in particular. So this is, I think, a crucially important area that does not get enough coverage. Most doctors just aren't talking about this. I don't even think they're aware of this connection. So would you mind maybe sharing a little bit about the connection between environmental toxins and metabolic health inflammation and diabetes and so forth?

Dr. O'Bryan: You know, we happen to be at the Institute for Functional Medicine's Annual Symposium right now. And it was at one of these symposiums seven, eight years ago Dr. Lee presented about liver enzymes, specifically GGTP liver enzyme. And if it's in the highest quartile of the normal range, so there's the lowest quartile, the next one, the third and the fourth quartile of normal range, not abnormal, but normal levels of this liver enzyme. You have, and I don't remember if it was a three or five-folds, I don't remember, three or five-fold increased risk of developing insulin resistance and metabolic syndrome. Three-fold minimum, five-fold, I don't remember, developing insulin resistance going into metabolic syndrome.

What does that mean? And where does that come from? If you're in that highest quartile of normal range, you've got environmental toxins that are accumulating in your body and in your liver. And those
environmental toxins are activating like an emergency brake. When you back out of a drive way and the car is moving, but what’s wrong with this car? The emergency brake. And then you let it down then you back out easily. So these environmental toxins are emergency brakes and the insulin receptors of our cells.

So even when you have enough insulin, it can’t get into the cell and so the cell says I need more sugar, I need more sugar. The blood sugar is normal and the insulin levels are normal in the blood stream, but it’s being blocked by these environmental toxins in the receptor sites. Really interesting and it is a contributing component, it's not the primary cause it's a contributing component to the development of metabolic syndrome leading to type 2 diabetes.

Now, where is that manifesting? And I just had a conversation three months ago with the head of FDA of India, it's called the FSSAI about this topic because 46% of all diabetics in the world are in India. And where is that coming from? And the primary place they've identified is coming from is the environmental toxins and air pollution.

The air is so bad that these toxins or these particular matter, the heavy metals, they're getting in, they're binding on insulin receptor sites and it’s contributing to the development of metabolic syndrome leading to type 2 diabetes. So what do you take away from this? Everyone's got to learn why I’m I being exposed to environmental toxins? And what are they? And then how do I reduce that load?

**Dr. Mowll:** When I hear toxins they can come from all sorts of places, right? Cosmetics, things we put on our skin, sunscreen for example, nail polish, lipstick, makeup. Also our food supply things like glyphosate, which winds up sometimes in our food supply often times. There are other endocrine disrupting chemicals that wind up getting absorbed through our gut. But you're saying air pollution is one of the biggest, is the biggest.

**Dr. O’Bryan:** Yes, it's identified as one of the primary contributors.

**Dr. Mowll:** Primary contributors, okay. So with that in mind, that seems to be one of the hardest things to change on a personal level. So how do we impact that?

**Dr. O’Bryan:** Easy answer.

**Dr. Mowll:** Perfect.

**Dr. O’Bryan:** Temporarily an easy answer in that is, you get air filtration systems in your house. If you can afford it, you get a whole home unit. If you can't, you get portable units. So where do you keep it? In the
bedroom because that’s where you spend the most time. And who’s bedroom? Your kids’ bedroom if you can only afford one, it goes into your kids’ bedroom because we have to protect their brains. Because it’s the kids that have to come up with the answers to the problems we’ve created.

Einstein said, “The problems you’ve created today cannot be solved with the same level of thinking that created the problem.” And all the adults are rigid and we’re locked in to our neurocircuits in the way we think. We need the next generation of brilliant kids keeping their brains functioning well. So if you could only afford one air filtration system it goes in your kids’ bedroom. Now, during the day it can be out anywhere the family is, but at night it goes in the kids’ bedroom.

**Dr. Mowll:** Now, I’ve read that indoor environments actually have more toxins in the air than even the outside air does.

**Dr. O’Bryan:** That’s right. In most places, some cities have really bad outdoor air like LA and all that. You run a 10 kilometer run in LA at 6.2 miles, you inhale as much particular matter as if you smoke a pack of cigarettes. Just running a 10K you’re trying to be healthy and you do it in an hour. You just smoked a pack of cigarettes. But for most places in the country and in the world, it’s the indoor environment.

So one of the things I tell every patient they have to do; number one, never run your dishwasher during the day because the dishwashing detergents are highly chemically toxic. And the hot water in the dishwasher vaporizes these stuff into the air and the dishwasher is not air tight.

So the scent, and you can’t smell it, but the gases come out on the dishwasher and your family inhales it. So you need to run a dishwasher? You run it at night when everybody is in bed. And the other thing you do at night, is you turn off the wireless every night. Nobody needs wireless on at night and you’re reducing the electromagnetic toxicity that you’re getting.

**Dr. Mowll:** Yeah, electromagnetic pollution is a biggie right now, for sure. Okay, so air filters are important, put one in your kids’ room, definitely. And you talked about dishwasher, probably laundry as well I would imagine because laundry detergents are all-

**Dr. O’Bryan:** That’s why MyGreenFills is such a great and I’m sure you’ll have a link for MyGreenFills.

**Dr. Mowll:** Absolutely.

**Dr. O’Bryan:** They’re great. They’re conscious, very environmentally
conscious about this and you’re safer with their products.

**Dr. Mowll:** So back with Dr. Tom O'Bryan. We were talking about environmental toxins and the link to blood sugar dysregulation and diabetes. So maybe we can expand on that a little bit more.

**Dr. O'Bryan:** Yes, you bet. It was startling when Dr. Lee’s paper came out that showed people measuring liver enzymes, GGTP in the normal reference range, not out of range, in the normal reference if they were in the top quartile, divided into four.

So they’re in the quartile of the normal reference range they had a large and I don’t remember the percentage but large increase vulnerability to developing insulin resistance, metabolic syndrome, type 2 diabetes. It was startling the response. And what increases GGTP, environmental toxins we’re exposed to; PCBs, phthalates like bisphenol A, these chemicals we’re exposed to every day. And our liver trying to protect us, makes some enzymes to break this down.

But if you’re in the highest quartile of what’s considered the normal range so it doesn’t flag a doctor when he sees the report because everything is normal. There’s no big red H for high and so the doctor will miss it. But if you’re in that top quartile, you have, the word they use is significant, significantly increased risk of insulin receptor sensitivity, loss of insulin receptor sensitivity so insulin resistance, metabolic syndrome, type 2 diabetes.

And it’s the chemicals in our environment. So the little things we can do like if you have a dishwasher in your home, you don’t run it until everybody’s gone to bed because it’s one of the most toxic substances in a home is the dishwashing detergents when you’re using really hot water closed to boiling.

So the steam comes out and that’s not an airtight door on a dishwasher. It's a watertight door but it's not an airtight door. So those chemicals come out into the air and your family is breathing them. So you don’t turn the dishwasher on until everyone’s out of the kitchen preferably upstairs in the bedroom. There’s two things you do at night before you go to sleep, turn the dishwasher on if you need to and turn off the Wi-Fi every night.

**Dr. Mowll:** So trying to avoid as many of these toxins as we possibly can, clean the air around us is important. But we’re still going to be exposed to some level of them. So what are some of the keys to detoxify the body or help to maybe cleanse the body off some of these toxins?

**Dr. O'Bryan:** First and most important thing in detoxing in my opinion is that the highway is opened, to carry this crud out of your body. What
does that mean? You have to drink enough water. You have to hydrate. And most people do not hydrate well enough. You want to know if you hydrate well enough, it's a half ounce per pound body weight, minimum. Half ounce per pound. You weigh 150; that's 75 ounces of water a day.

And what people usually say is, “Oh my God I'll be peeing all day." Well, that's the point, we want you to. You got to flush these stuff out. So first you have to have the highway working, good transportation on the highway to escort these toxins out. Then mobilizing the toxins onto the highway.

How do you do that? Aerobic exercise, going for walks, getting your pulse up a little bit but not too high. The formula is 180 minus your age plus or minus five. And if you've been diagnosed with a disease, it's 180 minus five. So it's 175 if you've been diagnosed with a disease of any type. 175 minus your age, plus or minus five. If you've not been diagnosed with a disease it's 180 minus your age, plus or minus five.

And that's the zone that you stay in for your exercise. And people who currently exercises but don't monitor, when they start monitoring what they see is, my God, my pulse is 20 points higher than what this says. That can't be right. I can't go that slow. No, that's correct.

Most of us are living off some type of stimulant in this crazy society today. It's coffee, it's sugar, it's caffeine in other forms, it's cigarettes or for the healthy ones, it's excessive exercise. And they're exercising in their anaerobic range. They're pushing too hard and it just pumps them up so they make more stress hormones, so they feel better afterwards, they're kind of pumped up, but the result is, you burn out your adrenal glands. So you can't exercise anaerobically above your ideal pulse range, regularly. Once in a while it's okay but not as a regular exercise. Regular exercise has to be 180 minus your age, plus or minus five.

Dr. Mowll: We see a lot of people who exercise very vigorously and their blood sugar actually goes up.

Dr. O'Bryan: And that's why. It's a stress response for all the stress hormones that are produced by the aggressive exercise.

Dr. Mowll: So that's probably not the best idea especially in that case. So often times we have to work on healing the body. Healing the adrenals, bringing balance back.

Dr. O'Bryan: Put a pulse monitor on them and say, “Your pulse monitor is your coach and there's one rule to exercise, never argue with your coach.”

Dr. Mowll: I like that rule.
Dr. O'Bryan: It's a good rule because your pulse says, you're going too fast. That can't be right. I need to go faster. No. This is the exercise range that will make you healthier. The exercise range that you're used to is the one that's making you sicker. In the short-term you feel great when you're doing x minute miles running or whatever it is you're doing, CrossFit or whatever it is. But if you're outside, if you're in your anaerobic range, you're causing degeneration as opposed to regeneration.

Dr. Mowll: So we talked about lots of water, the right type of exercise. Is there anything other than that special to help detoxify?

Dr. O'Bryan: Infrared saunas are excellent, you know, flash these stuff out. Of course hydrate really well. Also, eating all of your food within an eight-hour window during the day. And especially if you coordinate the time that you're eating in that eight-hour window with your circadian rhythms. So it's an old Chinese proverb, eat breakfast like a king, lunch like a prince, dinner like a pauper.

And if you do all that within eight hours and dinner is not much at all, maybe some vegetable soup or something that's it or something modest, the result is, your body is going to burn off more of the toxic stuff, get rid of the old cells, you increase your stem cell production. And when you increase stem cell production in your own body, so there's a lot of politics around stem cells, there's no politics around your own stem cells.

So if you could increase your own stem cells and you can do that, then you trigger healthier younger cells. This is patient, you have an entirely new body every seven years. Every cell in your body regenerates. Some are very quick like the inside lining of your guts every three to five days. Some cells are very slow, like bone cells and brain cells they're slow, but they do regenerate. So are you regenerating the same cell? Are you regenerating a sicker cell? Are you regenerating a healthier cell? When you do the eight-hour window to eat, you regenerate healthier cells over time. In six months, someone who hasn't seen you says, “You look great. You look so young. What are you doing? You look younger.” You are younger because you're regenerating healthier younger cells.

Dr. Mowll: Biologically you're getting younger. So you're aging the other way.

Dr. O'Bryan: That's right. It's a reversing aging protocol.

Dr. Mowll: The Chinese proverb that you gave reminds me of this early time restricted feeding. There's been some studies that have come out showing that doing intermittent fasting but actually putting the eating
window earlier in the day is showing really promising results for blood sugar regulation especially people who have this dawn phenomenon where they have the high rise in the morning. Those people if they actually eat something in the morning and then stop eating earlier in the day, seem to really get good results with that.

**Dr. O'Bryan:** Yeah, that's consistent with the whole circadian rhythm concept. It's like you're resetting your cellular rebuilding program. You're shutting down your iPhone because it's not working well. So you shut it back down, you turn it back on, you've rebooted it. So that's what eating like this does, is it reboots your metabolism over time, not in one day.

**Dr. Mowll:** And another way to help pull some of those toxins out of the body, help encourage the body to detoxify itself on a regular basis. We get younger, we feel better.

**Dr. O'Bryan:** Also skin brushing using a luffa sponge, always brushing towards always towards your heart, always towards your heart. So not down your arm, but rather up your arm and down your chest and up your abdomen and up your legs. Always dry brushing. You brush out dead skin cells and it makes room for new cells.

**Dr. Mowll:** Okay. Great. Well, I think this was a interesting conversation and some really important information about the link between toxins and blood sugar and diabetes and how to encourage the body to detoxify itself. So, Doctor Tom O'Bryan, thank you so much. If you people want to learn more about your work and what you're doing, what's the best place for them to go?

**Dr. O'Bryan:** theDr.com.

**Dr. Mowll:** theDr.com. Thank you, sir.

**Dr. O'Bryan:** Thank you.
Dr. Mowll: Okay. So I'm here with my good friend Stephen Ezell, who runs a company called My Green Fills. And I really want to talk to you today about toxins and blood sugar and diabetes. This is a big issue. There are numerous studies actually on how various environmental toxins, toxins found in home goods, cosmetics, laundry detergents, toothpastes. All these things can actually be endocrine disruptors, can actually block the effects of insulin at the cell level, can cause metabolic dysfunction, mitochondrial dysfunction, can raise blood sugar, can cause weight gain, and all sorts of problems.

But a lot of people don’t know what to do with that. So practically, what do you do, because they go to the grocery store, and they don't know what products to buy, they don't know who to trust. So I love what you're doing because it is a safe product that we can trust. So maybe talk a little bit about “why.” Why my green fills and then and sort of like what the benefits are there.

Stephen: Yeah. So the story starts a little over 11 years ago. I have an 11 year old son, we have four kids now. But when you're first time dad, everything was you know, kind of freaking out, a baby. When my son was a three week old, little tiny shrimp, I was in charge of one of his first baths. We had like the thing that goes over the kitchen sink.

And we found he was screaming, and I thought only because he didn't
want to take a bath. When I undressed him, he was covered in a head to toe rash. Like he was welted, it looked like he was whipped, and Scourge and he's screaming. And my wife is a nurse NICU. And I said, come here. And she came. So now when I saw her freak out, being a nurse, and dealing with babies, I freaked out, because if the nurses freaked out that I'm for sure, freaked out.

So we got him right to the pediatrician to dermatologists. I mean, all these things. And they wanted to prescribe him for like steroid creams and histamine blockers and then a blah, blah. And so now family is worried why the baby is sick. And a friend of the family says, “What do you use for laundry detergent?”

And I said, “Well, grandma always used the big bright bottle.” And she said, “Oh, no, you can't use that on babies, because babies can have an allergic reaction to laundry detergent.” So what do I do? And so we stripped his clothes with vinegar, and all this stuff. And then switched immediately and clean all of his bedding, all of his clothes with a non-toxic product. And then within a couple days, it was gone. And I was like, no medication? None of that stuff.

And literally, that was like my aha moment. Like, if laundry detergent can make my kids sick, what else is in the house? What's under the kitchen sink? Then I became, I guess, like a full blown eco conspiracy theorist. Like, what's on the back of every label and researching. So for years, I spent -- I would literally stand there at the grocery store, with this 14 letter chemical like, what is that? So years went by, I met this amazing formulator who was selling laundry soap at a farmers' market. And she says, “Hey, I don't know what to do with this company.” And I'm like, “I know how to build companies. You know how to make stuff. Let's go.”

And so My Green Fill came out of a pursuit to really help people detoxify their homes, and we started and really focused mostly on laundry, because we believe that laundry is the most toxic sick of all the consumer products. Now really, that's a loaded question because if somebody were to take oven cleaner, and spray oven cleaner on them, they would have such an acute reaction, because it's truly caustic and solvents and things like that.

But we don't think about laundry as having that level of toxicity. But we're literally wearing these laundry chemicals all day long. And so 90 plus percent of the supermarket aisle that you walk down to, like you get blown back with all of that scent, which I'll talk about a second. These chemicals are designed to leave a film on your clothes. Cleaning now is really not that important. Getting your clothes clean isn't that important, what people really want is fragrance. And this is where the smoking gun really is, and not many people are talking about it. You know, people that manufacturer of food, ingestibles, nutritional
supplements, anything that has to do with food, USDA, FDA governs that.

So if you're manufacturing food, a USDA agent they come in, they want to make sure your places clean and labels and all of that kind of stuff. And they verify if stuff that you're putting in people is true or not. There are some loopholes and even you know labeling for food. But in the nine years that we've been manufacturing cleaning chemicals, we've never had one agency, anybody ever walked through the doors and say, “Is what you're saying on the label truth?”

So it's really the foxes guarding the henhouse because you as a consumer have to trust all these chemical companies what they're saying on a label true. But there's this thing called the fragrance loophole. I'm sure you've heard about it or not.

But here's the deal, if I as a manufacturer, or anyone else, any of these other chemical manufacturers, whether it's laundry, window cleaners, whatever; if under 1% of the final product has any ingredient in it, I do not have to list it on a label. So when you see in the back label you will see fragrance, perfumes, you can literally loop in a smattering of chemicals under this 1% thing. And under trade secret laws, say its fragrance.

So even documented carcinogens, endocrine disruptors, hormone mimicry, these synthesize chemicals, they don't even have to list them on label. And it's legal. So it's really a frightening industry, and very few people are talking about it.

**Dr. Mowll:** Are all these things usually in these products?

**Stephen:** Yeah, and here's why. So I conducted my own little study. Years ago, our products were only made with pure essential oils. But the problem with essential oils is that in laundry, they evaporate, they're volatile organic compounds. When they come out of a dryer, there's nothing. So they get heated with heat in the dryer, even on a clothesline they evaporate, they don't leave any fragrance behind.

And our customers were demanding the products weren't -- things aren't clean, things aren't clean. And I was being talked about, you need to have fragrance. I'm like, “No, I'm not going to do it. No, I'm not going to do it.” We now use plant based fragrance oils that are safe. And we actually publish every single one of them on our site. You can literally research every single one of our fragrance ingredients, which I don't know any other company that does that.

But here's what I did to prove to myself that this is true. I went to Bed Bath & Beyond, cool store. I grabbed two beautiful white hand towels,
like bath towels. I walked into the parking lot, I took one of them, and I wiped it on my car. And there was noticeable brown, black streaks, wasn't like completely filthy.

But there were visible stains on this white towel. And then I went down the block, and I went to the supermarket I grabbed a couple of the big bright bottles. And I threw it in a spray bottle, add some water, and I sprayed the dirty towel with fabric softener detergent, the leading brands. And then I drove down the block to the mall in Traverse City, Michigan. I had my green full shirt on, doing a focus group. We have two different formulas here, we want to see which one you think is cleaner

And I had over 100 people that day. And I said which one? Nine out of 10 people in examining, smelled. So please test it, which one is cleaner? And nine out of 10 people put these rags to their face, and seven out of 10 chose a dirty rag. So nice. All right, maybe it's just because I'm at the mall. So I went to our local health food store, Co-Op.

And I'm like, all right, if I hang out with a bunch of my people here, maybe they'll be different. And it was different. Five out of 10 people chose a dirty rag at the health food store. And I said, well, we as a culture are addicted to fragrance. Because literally and immediately these fragrances pass the blood-brain barrier and it fire dopamine, fire these receptors.

We as man/woman, like we give off natural scent, so like that's why man is attracted to woman, woman is attracted to man. Like, in those moments, we give off pheromones and these things. So we literally have these receptors of arousal or love come through the nose, well, perfumers know that. So they mimic those pheromones in these perfumes and these fragrances in order to trick the mind and in different things.

Like, you walk in the big department store, and you walk through the perfume aisle, because literally they know that if you walk through the perfume aisle, you're going to spend more money at the store. Because it's literally going right -- you're passing the blood-brain barrier, you're firing dopamine, you're firing all these endocrine responses. And it's like, “I'm aroused, I'm ready to shop.”

**Dr. Mowll:** And they don't care about health. I mean, they're putting these scents in there for these reasons to basically sell more of their product.

**Stephen:** It is frightening. And because these -- I have to be careful, my position in the industry since I sell products, about naming other companies. When you have perfume companies that have all of these names that have sexual innuendos, you can connect the dots. These
products have 200, 300, 400 different chemical compounds in them.

And they're covered, everything is under 1%. They don't have to list the ingredients, they're covered under it. And you can take something that smell -- if you have like a cup full of a fragrance, it may smell like toxic sewage, but if you have it in parts per million, it may smell like hazelnuts. And it may be a completely just rank disgusting toxic thing. But because it's in parts per thousand, parts per million, parts per billion concentrations. It's safe for humans.

**Dr. Mowll:** And the skin of course is the largest organ of the body, we spray this stuff on us, rub it on us. We're wearing it on our clothes.

**Stephen:** Deodorants, we're wearing it, we're spraying it on us, in the dishwasher you're inhaling it. You know, women are spraying these toxic things right on their glands. Any perspirant with fragrance, so you literally have aluminum which is a known -- and so many people demand they're having heavy metal toxicity, women being one of them.

Women are supposed to detoxify through the armpits sweating, and we're stopping it. Like, we're stopping women because it's not good to sweat. So instead of wearing any perspirant, mix your fragrance. So now you have these concoctions of chemicals that you could never find out what it is. You're not allowed to, legally you don't even have to find out. And that's carried.

And you know, aluminum is used in vaccines as a carrier for actives. And it passes blood-brain barrier, gut barrier. So now we're being bombarded with fragrance. Laundry, UV brightness, you see a laundry jargon, it's bright blue or green. And the reason is, so that it literally leaves a blue or green film on your clothes so that under ultraviolet light, artificial light, it gives the perception of brightness. So it tricks our eyes into a new spectrum of light to trick us to think, oh, my clothes are cleaner and brighter. So I mean, it's really a messed up industry, we've taken a stand against it. And that's you know, a long answer, but that's why.

**Dr. Mowll:** What's in the laundry detergent?

**Stephen:** So there's major category, so cleaning laundry, everybody thinks laundry detergent gets my clothes clean, and it's actually not. What's actually getting your clothes clean as the water in your washing machine. What our job is, you know, products and chemists to do is to chemically alter your water in your washing machine so that we can get it to do what we wanted to do, get your clothes clean.

So having big bubbles is caused by a chemical family called surfactants. They're surface area reducing agents, they lower surface tension of
water, make water wetter to remove soils from fabric. But they do more than just remove soils because 90 plus percent of them are all petrochemical derived oils, because oils attract oils. There are some in the family that are plant based. So you have like the palm surfactant, coconut surfactant synthesis like Sodium Lauryl Sulfate, which is the one of the most popular ones in laundry and in lots of textile. There's synthesize coconut oil.

Now, these things they help clean, but they also help carry because their oils; they leave a film they leave a residue in the fabric. So chemists use those surfactants as a mechanism to leave ultraviolet light brightness, so UV brightness on the clothes. They also serve as a carrier for perfumes and artificial fragrance.

So literally, these surfactants are the binder. They help remove soils, but then they also leave film behind. So sometime you take a shower, and you use a fabric softener, and you're wet and come out of shower and you go with a towel and the towel like slides off you. That's because of silicone type surfactant or silicone items like dimethicone; the most popular used in conditioners, used in fabric softeners.

So those dimethicone silicone type products, and those are meant to reduce ionic charge, so static, but they also again, serve as a mechanism to leave a film on the clothes. So you have like this perception of softness, and it's not soft. You're just feeling that silicon slime on your clothes. And now you're coming out of a shower, it's hot, it's steamy, your pores are open, and you're wet.

And you're taking a towel that's literally soaked in these chemicals. You're making micro suds with fragrance and these fragrances have endocrine disruptors, hormone mimicry, just a pharmacopoeia of crazy stuff. You're taking surfactant, UV brighteners, all these things, And maybe on their own, they're innocuous. But when you put them in concert with 30/40 other things, no one knows, you know.

When you add two/three things, you have a new chemical compound. So really we're creating these new chemical compounds, you switch products. So you go from product to product. That one product left this on your clothes, this product left that. So now you're combining in your washing machine, and now you're wiping it on your wet skin. It's frightening.

And it's because of guys like you that people are changing their mind, because we're educating that there's another way. And you can't do this stuff anymore. You remember, like high school you did your high school experiment; you took baking soda and vinegar, and you made your volcano. Well, you just made sodium acetate. You just made a whole new chemical compound, there's a reaction that takes place.
Well think about that. So simple. Well, that happens every single day. That happens with the window cleaner, the dishwasher, the laundry, the surface. All of these things when combined together, you don't know what you're creating. You don't know these chemical reactions. And we're breathing it in, we're putting it on our skin. In a dishwasher, you're leaving that film on your glasses, on your plates. When you clean something in your sink, use hot water or cold water, or use hot; hot clean is better. Well, hot has a lower surface tension. When you have a hot cup of coffee in the morning, and your cup was cleaned with a toxic dishwashing detergent. You now have a film that's squeaky clean. That's because there's chemicals left on the cup. So now you're taking a hot, acidic liquid, putting it in a cup that has a chemical film. Where's it doing? Drinking. It's everywhere. We're breathing it, we're ingesting it, and we're wearing it. It's everywhere, so environmental toxicity is literally everywhere.

**Dr. Mowll:** So the answer isn't to just say, this is impossible, I can avoid this stuff. It's all over the place anyway. You know, and I hear that sometimes, people get overwhelmed with it. The answer is to start making small changes, you know, start with one product, do another product. Swaps, take something you're already using, try something that's more natural. And start with one thing like laundry. I think it's a great place to start.

**Stephen:** Yeah. My Green Fills, we'd love to have people join what we believe in. That's awesome. But I have this belief that if you get enough people voting with their dollars in a better way, markets can change. It's true right now, it's see it's overwhelming, that we're being bombarded with environmental toxicity in our homes, in our environment, at the public restroom when they're spraying, it's everywhere.

But here's the thing, so organic spinach; you go to the store, organic spinach is pretty much the same price as regular spinach now. Years ago, it was like 10 to one. Why is it the same price now or sometimes cheaper? Because enough people voted with their dollars and said, we're demanding organic spinach. And what happened was agriculture said, Wait a second. There are a lot of buyers here that are buying organic spinach. If we don't figure out how to pivot and scale this particular product, these companies are going to eat our lunch, pun intended.

So what are we going to do? Either we're going to go out of business, or we're going to figure out how to make more organic spinach. It's not because farmers became philanthropist. The market demanded something better. So we get enough people voting better with their dollars on non toxic products, organic products, label transparency. Either these big companies that are hurting people, either they're going to pivot or they get out of business.
You know, years ago when my son was sick, because of laundry products -- companies are trying to kill us. They're not, because now I have lots of big businesses. I've been very blessed, very successful. And I know a lot of executives at these major companies, and I tell them what they're doing. And they don't even know, because they don't want to kill us, they want to sell us.

Big companies, they want to sell us they don't want to kill us. If we tell them, we're voting with our dollars this way. And this is what we want to buy. And that's what they're going to sell us. And they're going to have to shift and the economies of scale will change, right? Where the guys that are making toxic things will either have to figure out how to make non toxic things, or they're going to go away, because the market has no conscience. It's just going to do what it does.

So if we get enough people making these as you saying -- you know, Tom O'Bryan is making bayset. You talk about making these little swaps, one little thing here; instead of this window cleaner, I'm going to use vinegar. Instead of this thing, I'm just going to use baking soda. Instead of this laundry product, I'm going to use this laundry product. If enough people do these little things in concert, things will shift.

Dr. Mowll: Stephen Ezell, thank you so much for taking the time with me here today. My Green Fills, and we'll have some information here with a video for learning more about your products and what you’re doing. So thank you for being here.

Stephen: Thank you for what you’re doing, man. You’re changing the world. I appreciate being your friend.
Dr. Mowll: Okay, so I'm here with Sachin Patel. And Sachin, I've been following your work for a long time. I just love your perspective on how you see health really, and the way we treat health problems and really what health is all about. So I would love to get a better understanding of how you see diabetes in particular, maybe how it's conventionally treated. And then maybe if you have in your mind sort of a better idea to approach people with blood sugar problems, would you mind sharing that?

Sachin: Sure. First of all, thank you. I appreciate you interviewing me, to give me this opportunity to share. So the first thing I'll say about any disease, but in particular diabetes, the most difficult thing about diabetes is not the disease but it's the diabetic. And so really understanding that unpacking gene, that's a pretty loaded statement, but I want unpack that for everybody.

So your body is never trying to fight you if you're trying to get healthy. There's no resilience to that, there's no combativeness. So one of the things that we have to first change is the language and the dialogue that we use towards this process. There's no war on diabetes, just like there's no war on cancer. There's no war on autoimmunity, because the body doesn't fight back. The body wants you to do what's right for it.

Now, one thing to understand when it comes to diabetes is that blood
sugar is not only influenced by what we eat. This is a very common misconception. Blood Sugar is influenced many times by what we eat, but it's also influenced by something called cortisol. Cortisol's main function in our physiology, isn't for it to be a stress hormone. It's actually to be a blood sugar increasing hormone. So cortisol main job in our body is to raise blood sugar. So guess what, anything that raises cortisol, consequently raises blood sugar. One of the ways we identify this with our clients is we have the wearable continuous blood glucose monitor. And while they're wearing this continuous blood glucose monitor, we're tracking their blood sugar every 15 minutes.

Every 15 minutes, the device takes a little snapshot of what their blood glucose levels are. And we can populate a little chart over time to see what their blood sugars are. What's really fascinating is that we can see the impact that food has, but then we can also see the impact of arguments or the impact of traffic or the impact of jumping on your computer and answering emails. We can actually see people's blood sugar go up in the absence of actually eating something, and it all has to do with their cortisol levels.

So a lot of times people will come to us or they might come to you, or they might come to their health care provider. They're doing everything right when it comes to diet nutrition, but they're not doing everything right to balance their autonomic nervous system, and specifically their stress response which raises cortisol which then raises their blood sugar.

When your cortisol is elevated, the other thing that happens is a natural byproduct of that is you become insulin resistant. And so once you become insulin resistant, the blood sugar stays higher than normal. That, of course, we know creates a whole set of complications as a result of chronically elevated blood sugar.

So it's the cortisol that raises blood sugar, increases insulin resistance, but then over time, you can also become cortisol resistant. And what that means is that you have to make even more cortisol to create the same stress response, so the same blood sugar response than before. So sometimes when people become insulin resistant, we have to go a step above that, and realize that these people are probably also cortisol resistant. And the one thing that disrupts cortisol is melatonin.

So we can actually use melatonin because the adrenal glands do have receptors for melatonin, and that actually shuts off cortisol production. So we can use melatonin as an A to shut off cortisol production, which then balances blood sugar, which then also balances insulin and uncoupled that insulin resistance and cortisol resistance that people develop over time.
Dr. Mowll: I just want to unpack some of what you said; if we look at how conventional diabetes treatment is done, you made a statement that it’s not all about what we eat, but is very diet centric. You go to a dietitian, you go to a diabetes educator, and it’s a lot of it is about what you eat. Or it’s about managing medication, that type of thing, the treatment. What you’re talking about is something that’s rarely discussed.

Now, in conventional diabetes treatment we know that certain stressors will raise blood sugar, because we see it. We know that, for example, taking prednisone therapy, steroids, anti inflammatory treatment, for one reason or the other, will cause a huge spike in blood sugar. And this is synthetic cortisol.

Sachin: Because of insulin resistance.

Dr. Mowll: And insulin resistance, exactly. In fact, I’ve seen many cases where long term treatment with prednisone induces diabetes. So by the same logic, I think we could say that long term exposure to stress, and maybe we can unpack what stress is, will cause this high cortisol, cortisol resistance, insulin resistance and raise blood sugar.

Sachin: You got it. So the thing with stress is that -- so the question is, okay, what are we eating? The next question is what’s eating us? So that’s what stress is, it’s eats us up from the inside. So despite what we eat, what we have to realize is what response are we actually creating in our body? So I could put rocket fuel in your Ferrari, but when you drive off in the wrong direction, what good is that?

So a lot of people are eating healthy, but they’re fueling a stress response, instead of fueling a healing response. And you can’t be in a state of stress and in a state of healing simultaneously, you’re either one or the other. So you can use that nutrition to fuel a stress response or you can use that same nutrition to heal and regenerate and replenish your body, but you can’t do both.

And what most people want is they want to heal and regenerate, repair, reproduce all those things that they’re coming to see us for. But they’re putting their physiology in a stressed out state. And so they get the exact opposite results. For example, I’ve been sharing this with a few people and they’re really fascinated by this information. I was, too, when I first heard it. At rest, 50% of our blood flow goes to our liver and our kidneys.

And so that’s significant because when you’re in fight or flight, only 5% of your blood goes to your liver and kidneys. So if somebody comes to me and they want to go on a detox protocol, would be unethical for me to give them a bunch of supplements and keep them in this constant fight or flight response because I’m not even sending blood to those organs.
to actually take advantage of the nutrition that I'm putting into that person's body.

So the only way to really fix this person is to get them parasympathetic first, you know, tweak their nervous system, so it's not so triggered and not so overly responsive to stress, so that they can actually send blood to wear they want to heal. So a key thing to remember is where you send flow is where you send function.

So if I want to increase the function of gut health, increase the function of my detoxification, my liver function, kidney function, I have to send blood to those organs to do that; just like if I want to run away from something, if I'm in a fight or flight situation, I need to send blood to my arms and legs. And that has to come from my trunk.

So I take it from here, I shunted from my core, and I send it to my arms and legs. And now I've got this whole cascade of things that are taking place in my body because of the chemical signaling. And then take that fire that I've created, or my emotions have potentially created or my environment has created. And then I've got to put it out. That's an exhausting process.

Imagine having to rebuild, and then burning the house down and then rebuild it, burning it down. And you just did that constantly over and over again, you're never really going to get any progress. One thing to remember for people is, despite the fact that your cells are renewing constantly. You know, every three days our gut lining replaces itself, how cool is that? So the question you have to ask yourself is why do people stay sick?

The reason they stay sick is the same reason that buying you a new car doesn't make you a better driver. We have to send the cells, these brand new cells a new message, we have to send them a message of healing and repair, not a message of what we call the cell danger response where the cell thinks it's going to be in a catabolic breakdown type of state; we need to send flow and function to that area.

And we only do that if we're in a parasympathetic relaxed state. Everything works better when we're in that state of our nervous system. Now, how we unpack that, is very unique for each person. For a lot of people, a big trigger for their chronic stress response is childhood trauma, or unresolved trauma or mistaken trauma; things that they don't even know are problematic for them. Things that they may not, at a conscious level, be able to associate with, but it's constantly triggering them.

It could be a certain scent, it could be a certain voice. It could be a certain name. It could be the environment of their office. It could be...
their boss's voice. I mean, it could be so many things that are triggering them, but it's not the person or the event that's the problem. It's their past traumas that are being triggered that are the problem.

And so that's what needs to be fixed. And so most people don't realize this, but our nervous systems -- really our understanding of the world happens between the age of zero and eight. So this is where our fears come from, where our belief system comes from, our value system comes from. This is why as much as people try not to become their parents, they become their parents, because their parents raised them and program them.

So this is a software that people are constantly running in their heads; what should I be afraid of, is the world a safe place, is the world a scarce place or an abundance place? This value system that we carry around with us then determines what can trigger us and what doesn't trigger us. And sometimes we don't even know what those things are.

So for me, for example, when I was young, nothing was ever good enough for my parents, okay. And that was their way of showing me they loved me, was to push me harder and harder. In our culture, what I learned as I grew up, I was like, all these kids who are less accomplished academically than me, why are they getting all these gifts and being showered with all these praises? And we don't get any of that. And it's because my dad never got that. And his father probably never got that.

So we pass these things along from generation to generation, and these are traumas that some of us live through. And so it can be a big problem. And so for some people, nothing is ever good enough and that stresses them out. And they could be ultra successful in life and from the outside appear very successful and they have it all together. But in their head, they've got this traumatized belief system that nothing's ever good enough. So they just keep pushing themselves and pushing themselves and pushing themselves and that can deteriorate their health, too.

Dr. Mowll: So as you're talking about this, I'm just thinking that when we think of stress, it's just way more complex than having too many responsibilities, not enough time, being overwhelmed with work or life experiences that are happening on a day to day basis. A lot of these things are ingrained patterns. And the way we essentially operate in the world can actually trigger the stress response in our body, which may be the thing that's raising blood sugar leading to insulin resistance and diabetes.

Sachin: Really all chronic diseases.

Dr. Mowll: All chronic disease, you're right. So how do people identify
these patterns? How do people really put their finger on where their stress is potentially, you know, there are stressful stimuli potentially coming, so that they can then work on coming up with some strategies to maybe re-pattern or overcome that.

**Sachin:** Yeah. It's a super great question. So one of the things that we have people do is use heart rate variability. So heart rate variability for anyone who doesn't know, is basically measuring the beats in between your each -- the amount of time between each heartbeat has a slight variance to it. So when we're in a fight or flight type of state, the heart rate variability is actually very low.

So the timing between each beat is actually very consistent. When we're in a relaxed state, the timing between each beat, there is a little bit more variance. And that variance tells us if somebody has a high heart rate variability, that's a good thing. Or if somebody has a low heart rate variability, which then tells us they're in a stress dominant response.

So what we can do, the override of the stress response is our breathing apparatus. So by stimulating our vagus nerve, which is cranial nerve number 10, we essentially tell the nervous system to go into a forced relaxed state, we can use breath to override this system. This is why every ancient form of medicine uses breath.

So Tai Chi, yoga, Qi Gong meditation, they all use breath as the intervention. Maybe they didn't know why it worked or how it worked. But we know now anatomically, the vagus nerve basically interface all of these organs, and it's responsible for that communication between the brain and the rest of the body. So when we go into a stress response, we turn off the vagus nerve.

One way to turn on the vagus nerve is through deep breathing. And that overrides that stress response, is why people getting anxious, they have them breathe into a paper bag. I don't know if that's the approved methodology, but basically you control your breathing. That's what a Wim Hof technique is, is to learn how to control your breathing under extreme circumstances to build resilience. And that's what all the deep breathing methodologies are, as well, to get that parasympathetic nervous system to activate.

And so when somebody does that, we can actually put them into a relaxed state, keep them there for a few minutes, they go into a pattern called coherence. And then we can have them start thinking about past events in their life. We can have them start thinking about people or circumstances or situations, and we'll see their heart rate variability go out of coherence. So now we know that there's something that's psychologically upsetting them that they probably need to unpack.
You can also work with a hypnotherapist. This is somebody who can use things like timeline regression or hypnotherapy to really trace back to where this trauma is coming from. And it doesn't always have to be abusive trauma. It doesn't have to be, you know, somebody who is out to get you like, my parents weren't out to get me.

But they thought they were doing what was best for me and my brother, and you know, we're both successful practitioners for whatever that means, but it's still never good enough. And so we live in that. And it could create this relentlessness in us. But we feel that it's not good enough, even though from the outside looking in, other people might feel that way. And they are kind of wondering, like, what drives this person? But it's actually a trauma that's driving the whole things, right.

So this can happen to some people and this happens to people who may be not very suspecting to it. So it's important to kind of look back and identify some of these patterns and see, you know, in some cases, how are they helping you, how are they inspiring you? Or how are they pushing you further in your industry, in your profession? But also how are they potentially sabotaging you?

Dr. Mowll: Chronic disease, blood sugar, diabetes, I don't think it's as simple as many people think it is to optimize blood sugar once you've lost it. And this is one reason, there's a lot of underlying patterns that are driving these states of disease and dysfunction. So thank you for shading so much light on this topic. I think you gave people some really good strategies today. So Sachin Patel, if people want to find out more about you and the great work that you do for patients, clients and practitioners, what are the best places for them to go?

Sachin: I'd love for them to check out our website, they can go to becomeproof.com. And they can also opt in for a free 30 day program that we have there, and will send them an email every single day with a little video, gives them 30 of our best tips. These are the things that we would tell you if you were a patient, but we realized that many people weren't doing these things. And so we want you to actually have a strategy, you stay at our practice, but we promise you that if you ever need us, we'll provide the best care possible. We want to give you at least that fighting chance to stay at our practice.

So the other thing I wanted to say that would be extremely beneficial for somebody who has diabetes or you know, wants to learn a little bit more about how their nervous system or their circumstances or environments are affecting their blood sugar, is a continuous glucose monitor. So a CGM, which is what they're known as, it's just a little tab that goes on the back of your arm and they can track using an app on your phone, or a reader it can track your blood sugar every 15 minutes. So we can see you know, what impact is food having on your blood sugar. What impact
is stress having on your blood sugar? What impact is exercise having on your blood sugar?

And this immediate neurofeedback allows people to very quickly start making better decisions for themselves. In fact, one of my friends Lisa, she bought it for her dad, and who's been like a very stubborn diabetic. And he's been following the dietary advice and his blood sugars really weren't doing what he wanted them to do, but he's only checking them three times a day. Now, when you're multiplying 24 by 4, and you're getting four readings every hour, you're almost getting 100 readings per day.

So you're getting 33 times more data, and that data allows you to make better decisions. So within a week, he cured. I want to be careful, I say that. But he normalized/stabilize his blood sugar on his own because the app and the process gamified it for him. And he had an exact tool to tell him what was affecting his blood sugar and he could make immediate changes. And you can see the results and the results spoke for themselves.

We are always here to help. We do lots of great webinars and collaborations like this. So thank you for this opportunity. And I really appreciate you, brother.

**Dr. Mowll:** All right. Likewise, thanks for sitting down with me.

**Sachin:** Absolutely.
Extended Interview
Robyn Openshaw

Dr. Mowll: Okay, so I'm here with Robyn Openshaw, the Green Smoothie Girl. And we're going to be talking today about modified fasting, which I'm really excited about. This is one of the techniques that's actually been shown, proven, published, peer reviewed, researched to not only help control and improve blood sugar, but actually to reverse type two diabetes. And there's been several studies indicating that.

So I'd love to get your perspective on fasting in general, because I know you've done some long fast as I have. And they're great, but they can be really challenging and sometimes tough on the body in some ways, especially for people with diabetes, maybe not the best idea. So I'd love to get your perspective on fasting and then this idea of modified fasting.

Robyn: Yeah, it's not new to new know that fasting, for an extended period of time anywhere from a few days to a month or more, is incredibly regenerative for the human body, because the body doesn't have to spend 65% of its energy metabolizing food, which is what we do every day. But when we give our body a break from that, it quickly shifts into rest, rebuild, repair modes.

One of the most important elements of that and I think it should be in everyone's vocabulary, especially people with blood sugar issues and diabetes is autophagy. And autophagy, or you might see it spelled out AUTOFEGE, is what it looks like, really what it means is self eating. And what happens is when the body is given some time and space, and doesn't have to be metabolized food constantly, just constant input of fuel, it can shift into breaking down the bad guys; breaking down the broken parts, but breaking down the old parts, tearing down things like cancerous growth.
And I'm sure people are watching this going, “Well, I don't have cancer.” Yes you do. Everybody has cancer. We have 50,000 cells a day they're mutating. We cannot be bombarded with the GMO foods and the chemicals, the roundup that all of us have in our bodies. At this point we have 80,000 chemicals approved for use in our air, water, food. This has never happened before in the history of human beings, and that makes it much harder for people to fast.

Thousands of years, people fasted for spiritual reasons, for physical purification reasons. Now people struggle to fast. And some of the researchers in fasting not only say the fasting is one of the best things that diabetics can do. They also say diabetics should not fast unless they are under the care practitioner. But with the medication issues, there are medications you shouldn't be taking when you're not eating any food for days at a time.

So like you, I've done my own experimenting with fasting. And in the last 25 years, I've done seven different fasts where I ate no food from anywhere from seven days to 20 days. So I've done that seven times. It's very difficult, I'm not able to carry on with my life. I'm a competitive athlete, I can't play sports. I'm mostly sitting in my bed, trying to work and mostly my brain isn't entirely functioning, or I might go for a short walk during the day or just watching Netflix. And so when I'm going to do a seven day fast because I know it's the very best thing I could possibly ever do for my health. I think the evidence is clear on that. It's like I have to take vacation days.

I don't want to spend my vacation days you know, sitting in some ashram or water fasting clinic, eating nothing because I can do it at home. The fridge is there and I have no willpower; I can't do it, I can't do it. Some people can. But what's so exciting for me as a researcher, I think it's the most exciting thing I've discovered in this century so far.

It turns out that major research institutions like USC and Johns Hopkins are finding that you can do a modified fast, you can eat up to 800 calories of organic plant-based meals spread out throughout the day. And I've developed a program for it, where for very, very inexpensively, you can eat five mini meals a day and you are achieving all the same benefits of fasting.

I could not have possibly known that had there not been these researchers who did these clinical trials. And I think that's super exciting. So now I'm doing a modified fast for the first three days of every month and I'm eating only these five specific mini meals that are keeping my diet very, very clean.

And I'm achieving benefits like in everybody that we've put on it; hundred percent of them say inflammation is disappearing, achy joints
gone. And we’ve had people who they’ve lost anywhere from three to 6.4 pounds, all of our flash fasters so far. And the ones who lose 6.4 pounds say, of course there’s some water weight in that. But the thing is about waterway, like people think, oh, that’s not important weight to lose.

Well, let me tell you what water weight is when you eat it totally anti inflammatory, modified fasting diet where you’re eating small amounts of food within a window and letting your body do the repair work in the rest of the 16 hours a day, is that as inflammation heals, there’s trillions of inflamed cells that heal and release dirty fluids. That’s what the water weight is. So that’s not a bad thing to lose either.

**Dr. Mowll:** Not only that, your insulin levels come down which means that you’re holding on to less sodium and you can dump some fluid. And that’s a good thing, you know, we want to do that blood pressure can start to come down and normalize, and the body works a lot better. There are a few key points that I’ve learned that I think fit this really well. There is some work done by a researcher named Roy Taylor in the UK.

Now, he didn’t do three, four or five days; he would do longer periods of time for a week sometimes. And this is in a very controlled setting with people with type two diabetes, but interestingly, around the same calorie amount. So in that 700-800 calorie range, almost exactly like you said.

Now I don’t necessarily agree with the products they used during these trials, but you know, they’re clinical trials and they wanted to control everything very carefully. And the results are astounding, people are reversing type two diabetes, eliminating medications in, sometimes, six or eight weeks, so very powerful.

And then there was, of course, the fasting mimicking research by Valter Longo that showed that same type of structure over a shorter period of time done repetitively, month after month, also able to reverse beta cell damage and improve blood sugar and even reverse type two diabetes, at least in animal study. So powerful techniques, and I don’t think it’s a coincidence that these are all around the same calorie range. I think the research shows that if you cut calories a little like 500-600 a day, which is sometimes recommended by conventional dieticians, and so forth. Your metabolism just slows down to match that basically over a few days, maybe even less.

Fasting that doesn’t happen, you get this increase in growth hormone and after you sort of shift into being able to burn your stored fat and other material get into autophagy like you said, your metabolism actually keeps going pretty well. And I think that happens too, seems to happen from what the research shows with these lower calorie periods of time.
So what you’re doing essentially is you’re getting some of the benefits, like you said a fasting without crushing your metabolism. And then you’re only doing it for three, four or five days. What you’re talking about here is a three-day program done monthly or however often you want to do it. And then you get the same benefits of fasting without, again, crushing your metabolism. And then you’re able to just recover and get back to good old healthy eating again after that.

So I love the concept. I think it’s a perfect fit for people with diabetes, pre-diabetes, metabolic issues. And again, you don’t have to worry about the medication issues. Now, if you’re on, obviously, mega doses of insulin, you still need to work with your doctor on a low-calorie diet. But it’s totally different than trying to do it, you know, seven- or 10-day water fast, for sure.

Robyn: Yeah, as I look at the literature and the recommendations that have come out of it, there’s always a caution to diabetics; that if you’re going to water fast, you absolutely need to be monitored. And you have to have those meds being watched because sometimes those meds can have serious consequences if you’re not eating.

And so that has to be overseen. However, when you’re eating five mini meals a day, we don’t have those issues. So it makes the health benefits of fasting available to far more people. I still wouldn’t necessarily do it on maybe stage four sick patients, where their bodies actually metabolize muscle, but I think it makes it very accessible for diabetics.

Dr. Mowll: The other thing I think it’s important is -- so we can look at the amount of calories that you eat over these days. But I think what you eat is obviously really important too. So in the program that you you’re putting together here, what do people actually eat over those three days?

Robyn: Yeah, the flash fast is fairly high in protein and moderate in fats, and moderate in carbohydrates; high in protein considering that it’s a plant based diet, so you actually can do one of two options. One of them is not entirely vegan and it has a bone broth in it. And everything else in it is vegan, but you do get you kind of have a treat once a day of a bar. The bar is actually made up entirely of greens, vegetables, and fruits, and nuts and seeds.

And then the shakes that you’re getting everyday have a little bit of like quinoa and flax. Some superfoods in them; some fruits, but mostly it’s plant proteins, the highest quality plant proteins. And so, you know, you get a fair amount of satiety given the fact that you’re only getting under 800 calories a day. And it helps that you can eat five times a day.

So we did a deep questionnaire with our first 100 flash fasters. And
again, they all lost between three and 6.4 pounds. 100% of them reported decreasing or disappearing, noticeable effects of inflammation. If you notice that your knees don't hurt anymore, you can extrapolate from that, that there are literally trillions of cells that healed in the course of three days. And that’s just so exciting. Like you said, one of the things that we know from the research on modified fasting is reversing the damage to beta cells. We know that people are getting off of meds. Now, we're not telling you to go off of your meds. Of course, you always have to work with your practitioner on that. But I'm talking about practitioners advising people to get off of meds.

I'm not pre diabetic or diabetic, and I am doing it and I am committed to doing it for three days, at least quarterly as a great preventative. They've done some longitudinal studies and shown that people who are doing a modified fast several times over the course of six or eight months, they still had kept the gains of it in reversing diabetes and other conditions a year later.

So it appears that the gains that you achieve in your hyper fueling stem cells -- and those stem cells are rebuilding and that's part of the process after autophagy is then there's the rebuilding. So after you do a three day modified fast if you want to do the flash fast, make sure you eat a whole foods, mostly plant based diet for that same length of time afterwards, because -- it's like Dr. Longo talks about the metaphor of what if you're on a wood burning fuel train.

You're on a train and there’s a wood burning stove in the car that makes the train get to its destination. Well, what if you're going to run out of fuel before you get to the station? Well, you're going to tear down some of the oldest benches and throw them in the wood burning stove. When you get to the station, you got to rebuild the seats that you tore out. And so what are you going to rebuild it with? That repeating process is also key in your healing if you're looking to avoid diabetes, or if you're looking to reverse diabetes. And so you don't just three days later, you know, just drink a bottle of wine. Three days later you can continue on with a healthy diet, that's important too. So that what you rebuild the broken down parts from, is quality ingredients.

**Dr. Mowll:** So I think this is great for people, a lot of people watching this are interested in fasting. They've heard about the benefits of fasting but they're intimidated by the idea of doing water fast. And I think this is a great way to get a lot of the same benefits without it being torturous for someone who, especially, has never done a fast. So I love the idea. So flash fast, and we'll make sure we put a link in here where people can find out more about the flash fast. But if people want to find out more about you in general, Robyn, what's the best place for them to go?

**Robyn:** I'm at greensmoothiegirl.com, also Green Smoothie Girl on
Facebook and in other places. And I have a podcast called Vibe.

**Dr. Mowll:** Okay, great. Robyn Openshaw, greensmoothiegirl.com. Thanks so much for spending some time with me here today.

**Robyn:** My pleasure. Thanks, Dr. Brian.
Dr. Mowll: All right, so I'm here with Dr. Robert Silverman, the author of the book, Inside-Out Health, a new book, which will be coming out soon. But we're going to talk today all about gut health and how the gut is connected with blood sugar regulation and diabetes. So for some people that seems like maybe a little bit of a far stretch. You know, how is the gut connected to blood sugar? So maybe you can help us understand that a little better.

Dr. Silverman: I'd be happy to. It's so funny that you said that, that it's a stretch, but the center of your universe is your gut health. Eighty percent of your immune cells are in your gut. It's where your macro, your foods, and your micronutrients, your vitamins and minerals are absorbed.

We've seen multiple studies that have shown that when you have any kind of excessive permeability to your gut, you have an increase in blood sugar dysregulation, prediabetes, diabetes, and the like. So it's a fascinating thing to see that the center of your health universe is, without question, your gut.

Dr. Mowll: I get that. I've heard that the gut is the seed of health and look first to the gut when you're trying to get healthy. What is the actual connection, though? So how does a faulty gut, a leaky gut, gut problems, how does that translate in to blood sugar issues?
Dr. Silverman: Sure. I think for a lot of the listeners, the viewers, let's define what a leaky gut is. Your gut is supposed to be semi-permeable. There is supposed to be a little osmosis and things transferring through. But a permeable gut let's proteins, and microbes, viruses go through.

When that happens, your body's immune system goes on alert. And it starts to actually attack these things because your body looks at these things as foreign because it's not something that it's used to accessing. So it attacks it. So it starts an inflammatory cascade or an autoimmune cascade throughout your body. Diabetes is a byproduct of autoimmunity.

Most issues, most conditions, most syndromes are a byproduct of autoimmunity. So by having a leaky gut, you're leading yourself down a path to autoimmunity. And one of these things are the prediabetes, the diabetes, and the diabetes.

Dr. Mowll: Maybe you can explain that a little bit more because I know, I think most people are aware that type 1 diabetes is an autoimmune disease, technically. Obviously, it affects children or young adults, and it really destroys the pancreas' ability to produce insulin, type 2 diabetes, completely different condition. You've said autoimmune disease or autoimmune situation in type 2 diabetes. So how are autoimmune factors associated with type 2 diabetes or metabolic syndrome?

Dr. Silverman: Well, you were great about type 1. And what's really funny is they used to call them adult in children. And so many children have diabetes now, they got rid of those terms. That's really scary. So to speak to those ideas of type 1 and type 2, type 2 still has autoimmune components because of the inability of the lock and key. So your pancreas, as you said, gives out insulin and wants to bring sugar in.

The problem is that the signaling is off. And that is a byproduct of that autoimmunity that we've talked about. So the real question is, “How do I avoid these gut issues?” Well, something called dysbiosis. Dysbiosis means a leveling of good and bad bacteria. But what's shocking about good and bad bacteria is you need about 85% good bacteria for bad bacteria to not be in dysbiosis.

So when you have dysbiosis, you have signaling issues, too much bad bacteria to good bacteria. These signaling issues, again signal inflammatory signals. And believe it or not, they do so through what we call our nervous system or an enteric nervous system. And that is why that enteric nervous system is led by the vagus nerve. And that is why they say the gut is the second brain.

Dr. Mowll: So you talked about good and bad bacteria. There are some studies describing enterotype with bacteroides, prevotella ratios, and
so forth. Do you think that's valid? Is that a useful concept or is it more complex than that?

**Dr. Silverman:** Oh it's a very useful concept. And there's a lot of literature to back it up. So we want that balance between good and bad bacteria. The problem is it's not like a seesaw where it's 50/50 or 51/49, you win. That 85 to 15 is a really stout number. So you're always working on getting that good bacteria.

People are funny. They come in and they have some blood sugar issues. And, of course, we always want to change their diet. We always want to change their lifestyle. But we've got to fix their gut microbiota. There are studies that show when the gut microbiota is inappropriate or like we said with dysbiosis, that inflammation in the gastrointestinal cells are increasing their hallmark for type 2 diabetes.

**Dr. Mowll:** So how can you tell if you have enough good bacteria versus bad bacteria?

**Dr. Silverman:** Well, there are lab tests now that are actually talking all about your microbiome and talking about the inhabitance of your microbiome. So those are tests that we really recommend. Also, there are blood labs that I recommend to see the status of the health or the integrity of your GI. So these are great.

So there are things that we test for, LPS, lipopolysaccharide, it's on gram-negative bacteria on the inside of the intestinal walls. So when LPS is exposed, systemic inflammation follows. One of them is that increase in diabetes. So we test for LPS. We also test for LPS, interestingly enough, with other markers of IgE, IgM, and IgA—IgG, IgM, and IgA. I want to make that clear. So within that, that shows there's autoimmunity.

And the different immunoglobins tell the immunoglobin and the autoimmunity at different timeframes. So, for instance, IgM, IgA, and IgG, IgG is an ongoing chronic. Seventy-five percent of your immunoglobins are of IgG so you're built for chronic inflammation.

Actually, that immunoglobin [inaudible] is the placenta. And you can see how deleterious it is to overall health. IgM is something like morning. That's how I remember the M. You wake up. And it's acute in IgA is something that's reactivated. All these things, all these immunoglobins show that you're on a path towards autoimmunity.

**Dr. Mowll:** Wow, this sounds complicated, but important.

**Dr. Silverman:** Right, I didn't want to make it complicated. So basically, what you're finding out is if your gut is too permeable, there's autoimmunity. And autoimmunity increases your incidence of blood
sugar dysregulation. And blood sugar dysregulation leads you down a path of obesity, and brain health, and all sorts of other adverse effects to organ systems and failing health in most humans.

**Dr. Mowll:** So there's tests that you can run that will tell you whether or not you have leaky gut or not. And we talked about the different bacterial species in the gut. And you can have your microbiome tested, as well. Other than having diabetes and blood sugar issues, are there other signs that would indicate or symptoms that would indicate a need or a want to go have your gut tested or should everybody have it tested?

**Dr. Silverman:** I always hate to use the word everybody. But everybody should be concerned about their gut health. That's, “Do you have the gut to be healthy? What have you done for your gut lately?” Things of that nature. Your gut is the center of your Universe. So I would always do things to take care of my gut.

Fatigue. Fatigue is a major component of any kind of gut issues. Yes, some bloating after you eat, brain fog, 45 minutes, so you get gas and bloating. Because if you eat something that’s unsettling like a gluten—gluten means glue. Sticks to your intestinal tract, and damages your gut, and gives you leaky gut—so gluten is something that I recommend to avoid. So if you eat some gluten, you may get some gas and bloating. There are no pain fibers on your inner GI tract. So the only way your body can say, “This isn't good,” is gas and bloating.

Typically, after that, because the gut to brain axis is intertwined and they speak to each other in a millisecond, within about a 45-minute period, a lot of people get a brain fog. There are no pain receptors in your brain so your brain doesn't signal pain. The only way it lets you know that there's something wrong is by you getting what we call, “lethargic.”

So when I lecture, I always make that joke, I say, “Oh, it's about 45 minutes after lunch. Anybody having any brain fog because I don't think I'm boring.” Now you understand that you have a problem in your gut that leads to a problem in your brain. So it's dimming the neurons. So there are symptomologies that are really to lead you down a path of letting you know that you probably have some permeability in your gut.

**Dr. Mowll:** What do we do to heal the gut? And I know that's probably a very detailed answer to that if we're going to really do it comprehensively. But maybe in a more simple fashion, what are some strategies that people can use to heal their guts if they find out they have a leaky gut or dysbiosis?

**Dr. Silverman:** Well, that's a great question. So I have what we call a 7R Action Plan. So in the Rs, the first thing is we reset. We're resetting the lifestyle. In that lifestyle, we're going to put them on a low-glycemic
index, low inflammatory, possibly a Ketogenic/Mediterranean diet, which will individualize for your genetic needs and your goals. So any one of these diets are really, really good to avoid diabetes. Keto's got a lot of great literature because it's such a low carbohydrate, Mediterranean, low-glycemic index.

We’re also going to try and get you on an exercise plan. Fifteen thousand steps a day. Reduce your stress. Drink some water. So we reset that lifestyle. We reset that diet. That's number one.

Number two is remove. We want to remove the bad bacteria. So certain supplements make a lot of sense. Berberine takes a lot of things out of the lower bowel. Aromatic oils like oregano oil, especially if it's emulsified, works for the airway removing bad bacteria. Serum bovine immunoglobulin are outstanding because there's actually an immunoglobulin that grabs what we call an antigen. That's something that goes through the gut and it walks it away.

And changing that diet, once again, do you adhere to my GPS, no gluten, no processed food, no sugar, no dairy, no nicotine, and no artificial sweeteners. Artificial sweeteners damage your blood sugar. Higher incidence of diabetes, dementia, and stroke, three times to consuming sugar because they damage your gut microbiota.

Number three, what you interestingly enough, you would want to regenerate and repair or I like to call, “heal and seal.” So specific nutrients help heal and seal, L-glutamine, MSM, aloe vera, n-acetyl glucosamine, all great choices, all these things alpha-lipoic acid, fish oils, tremendous amount of receptors in fish oils, vitamin D, you are then able to regenerate and repair, heal and seal. And then you would then reinoculate. Don't give a probiotic when you have a leaky gut, reinoculate after the leaky gut. So then you would have a good bacteria of different choices, lactobacillus, acidophilous, saccharomyces boulardii, lactobacillus plantarum, and the such.

Then what you want to do is you clearly want to, guess what? You want to retest. You want to see where they were, whether it’s a symptom test or a blood test. And then you always want to retain your health so specific nutrients, multivitamins, and the like. Everybody should consider a low-glycemic index diet.

One of my big takeaways other than the GPS and the DNA is real simple. How many essential carbohydrates are there? Well, I'll answer that for you real fast. There are none. How many essential fats? There's plenty. And how many essential proteins or amino acids? There's a lot. So when you're not sure, a good quality fat, a good quality protein, avoid carbohydrates, a great choice for everybody to eat.
Dr. Mowll: We’ve covered a ton of information. And I know people are going to want to learn more about this. So you’ve got a great book out, *Inside-Out Health*.

Dr. Silverman: *Inside-Out Health: A Revolutionary Approach to Your Body*.

Dr. Mowll: Excellent. So if people want to find that or hunt you down and find more about what you’re doing--

Dr. Silverman: I love it when they hunt me down.

Dr. Mowll: how would they do that?

Dr. Silverman: My book's on Amazon. I have another book coming out in September. It's about the gut to brain axis. It's a lot about of what we just talked about. So if anybody's interested, Info@drrobertsilverman. My website is DrRobertSilverman.com and so is my Facebook. Feel free to reach out. I'd love to answer any of your questions.

Dr. Mowll: Excellent. Dr. Robert Silverman, thank you for being part of this and for joining me today.

Dr. Silverman: Thanks for having me. I appreciate it.
Dr. Mowll: Okay, so I'm here with Robb Wolf. And Robb has a great program, an online program called the Keto Masterclass. And we're going to talk about Ketogenic diets, specifically, to diabetes and blood sugar, and get into some other topics here, as well. So, Robb, thank you for joining me.

Robb: Huge honor to be here. Thank you.

Dr. Mowll: So let's talk about diabetes and blood sugar health and why a Ketogenic diet can be effective for people.

Robb: Sure, and let's parse it out and just look at type 2 diabetes first, then maybe we could get into type 1 diabetes. The type 1 crowd gets very cranky, overly broad when brush strokes are made on that. But it's maybe an over simplification. But the type 2 diabetic state, you could argue is a scenario of glucose intolerance, glucose toxicity.

People are exposed to an environment, internal environment, in which glucose levels are chronically elevated to a degree that it can cause blindness, neuropathy, limb loss, death, all kinds of significant problems. So if the problem is too much carbohydrate or too much glucose, why don't we limit glucose and carbohydrate in the diet as a means to start reversing the process.
Now, it's not entirely that simple. The whole state of insulin dysregulation is not just driven by carbohydrate, it's driven by an over consumption of food, at large. And depending on your make up, some people are good at storing large amounts of fat without becoming insulin resistant. I'm interesting in that I don't really gain a ton of body weight if I start eating in a way that is too many calories, too many carbs for me, my blood lipids go crazy and my blood pressure goes up.

So ages ago, this thing called the metabolic syndrome was delineated. And it was elevated blood glucose levels, elevated triglycerides, dyslipidemia, and also increased body fat levels. Not everybody gets all of those different pieces, which is why it's sometimes hard to unpack.

But the fundamental takeaway of why a Ketogenic diet would be valuable for someone who is experiencing type 2 diabetes or pre-diabetes is that one, we are reducing the glucose load, the glycemic load. But then, two, Ketogenic diets or even something like a high-protein Paleo diet that is getting carbohydrates from whole unrefined sources, both of those tend to be highly satiating.

So people tend to not overeat. So they spontaneous reduce caloric intake. And then once we off-load some degree of that fat mass and the insulin resistance, then we may get to a spot in which we have more of a normal glycemic response. So it's again, like if you really get into the nitty gritty of what's going on with type 2 diabetes, we have to have a little broader picture than just the carbohydrate story.

But what's interesting is every single clinical intervention that has looked at low-carb diets for diabetes in peri-diabetic populations has shown very favorable outcomes. So at the end of the day, instead of all the pissing match over the mechanisms of causation, if we just focus on clinical outcomes, some sort of a low-carb or Ketogenic diet is very, very effective.

**Dr. Mowll:** Now, some of the concerns people have with low carb is, “What do I eat?” And they’re left with the two other major macronutrients, which is protein and fat. And there are some camps that say, “Eat lots and lots of fat, high fat.” Others say, “You need to still make sure we’re getting enough protein.” And so I’d like to talk about that a little bit.

But, also, the idea of there is some concern from some scientists that overdoing protein can be problematic, possibly with the way it affects the liver, and production of sugar, and also the emtor pathway. So could you explain a little bit about what emtor is and how that should be viewed in relationship to protein in the diet?

**Robb:** Sure. mTOR is...Man, that's a big topic, in and of itself. But they've
changed the name, it used to be mammalian target of rapamycin, it's a gene which codes for two products mTOR complex 1 and mTOR complex 2, mTORC 1 and 2. I'm going to lump all of that stuff together instead of parsing out, okay, complex 1 does this and complex 2 does that. And it's actually the complexes, not the gene, but I'm just going to call it mTOR.

But mTOR is vital for a host of processes. It regulates elements of immune response. It regulates muscle mass accretion. It's critical in the inflammatory response. It is involved in cancer propagation. So it does a lot of different things. The things that turn on mTOR activity, interestingly, so like lifting weights stimulates mTOR activity, but it stimulates it in a little bit of a different way than protein consumption and carbohydrate consumption, which both of those things also stimulate mTOR activity.

It's pretty clear that overeating is a problem. It's hard to argue that. Whether you're Paleo, or Vegan, or what have you, mainstream medical practices, overeating is a problem. And it's thought that one of the problems that occurs is that we have mTOR turned on all the time, where we have it turned on to a degree that is inappropriate.

What oftentimes gets missed in this picture, we have people, and it's really interesting, we have people in the Vegan camp, we have people in the Ketogenic camp that are terrified of mTOR activity because they're worried about cancer, and justifiably so. But their solution is to reduce protein to remarkably low levels trying to basically turn mTOR off.

The problem with that is that some forms of muscular dystrophy, where we don't develop muscle mass or we lose muscle mass to a degree that we become incapacitated and possibly die, is because mTOR is inhibited. Some elements of the immune development like activating T-cells that are the primary defense line against cancers require some degree of mTOR activation.

So instead of thinking about this as something that should just be turned on or off, it should be thought more like a piano keyboard where we want to make a song or like computer coding where we want to send a messaging system that is consistent with health and not consistent with disease.

When we look at of the macro, again clinical outcomes, when people are deficient in protein, whether they're low-carb or low-fat, they have tendency to overeat. There's a concept called the protein leverage hypothesis that puts this idea forward that most organisms eat to a protein minimum. And then once you hit that minimum, you by extension have consumed enough vital nutrients to meet your needs. And we see this in primates and all kinds of different organisms.
But the flip side of not getting enough protein is that one will tend to continue to overeat. And the thought is that the neuroregulation of appetite is not getting stimulated because on some deep level the body knows that it hasn’t achieved adequate nutrition. So when we look at very protein-rich foods like lean meat, organ meats, even certain fruits and vegetables, the ones that are higher in protein tend to be more highly satiating.

And again, when we say, “Ketogenic diet,” we can have a Ketogenic diet that is set up for an epileptic that may be quite different than a Ketogenic diet that is set up for reversing insulin resistance and effecting very good body composition. We’ll see higher protein on the one hand for the body composition and just like metabolic health kind of standpoint. And we’ll see lower protein intake in the scenario of trying to effect legitimately elevated ketone bodies for a therapeutic effect, particularly, for neurodegenerative disease.

Dr. Mowll: Do you have a starting point for helping people to find that adequate protein?

Robb: Yeah, I think a safe starting point and a safe bottom level, and again this is for general metabolic health and maybe improving say like type 2 diabetes issues, I would say the bottom is .8 grams of protein per pound of lean body mass. You could make an easy case for going as high as 1.0 to 1.2 grams of protein per pound of lean body mass.

And I don't think you see much of a case for going much higher than that other than in a scenario like a protein-sparing modified fast, which can be very efficacious. But you feel horrible. It’s a short-term intervention. People will sometimes use a protein-sparing modified fast if they’ve hit a plateau. And they’re trying to goose things along. People will oftentimes do it, also, when they look at the clock and they’re like, “Wow! The class reunion is coming up in a week. And what am I going to do to look as good as I possibly can for that event?”

But those are pretty good bounds like those upper and lower bounds. So the upper end, generally, I would be hard pressed to see a need for more than like 1.2 grams of protein per pound of lean body mass. Probably, most people would do well at that one gram per pound of lean body mass and then the .8 is probably the bottom end.

And so, for me, I’m about 170 pounds, about 10% body fat, so that equates to about 150 grams of protein a day. Some days I get 120. Some days I get 180. So, for me, it’s a little bit of a variable thing there. I do base it a little bit around activity level. And like if I go out with some friends, like we went to a Brazilian barbecue last night, I guarantee you, I was probably closer to that 180 level than I was the 120 level. Even though I only had two meals that day, like I shut that place down.
But then today, I was actually not hungry and had less protein. So I go a little bit instinctually and really let appetite drive the boat on that. But I always make a point like that if I'm hungry and I'm thinking about a snack, I do protein first versus fat first.

**Dr. Mowll:** There's a lot of people listening to this who are eating a real-food diet. They've made a lot of the basic changes. But they're still having a hard time getting their blood sugar in to a normal range. Getting it under control. They probably still have some visceral fat around the belly and so forth. What do you think is a good next step for somebody once they've taken the soda and junk food out of the diet, and they really want to try to either reverse diabetes or make a big dent in it, get their blood sugar down to normal, what do you think is the next step for somebody?

**Robb:** Definitely carbohydrate restriction is a really good place to look. On the dietary front, if one is that prediabetic or diabetic state, you have to be lifting weights two to three times a week. Like this is a non-negotiable thing. And this doesn't mean that you spend three hours, three times a day in the gym.

You can go in and find a selectorized machine-based gym. And you go in and you do 10 reps of a light weight. Add a little more weight. Do 10 reps of a heavier weight. Keep doing that until the weight gets too heavy to say finish 8 or 10 reps, then move to another movement and do a press, a pull, a press, a pull. Do some leg work. And you're out. And do something that looks like that two to three times a week. That has shocking ability to improve glucose disposal in the muscles. And it's non-insulin mediated glucose disposal.

So I can make a case that because we are so sedentary, we rely exclusively on our pancreas for blood-sugar regulation, whereas we should be relying on some degree of physical activity actually playing a role in blood-glucose regulation.

So even if you don't like the gym, just simply doing air squats and pushups, and getting like a TRX set up to do some body rows, and doing some full-body circuits like that daily or multiple times a week...If we look at the literature, the results of some sort of a resistance training—if you want to do cardio that's great—but it doesn't improve glucose disposal remotely the way that resistance training does.

**Dr. Mowll:** All right, Robb Wolf, thank you so much for being here with me--

**Robb:** Thank you.

**Dr. Mowll:** the Paleo Masterclass, I'm sorry, the Keto Masterclass. And
if people want to find out more about that program or about you, in
general, and the work you're doing, what's the best place for them to go?

Robb: Hey, you can go to RobbWolf.com for just the podcast and
everything else I generally have going on. For the Keto Masterclass, it's
RobbWolf.com/km.

Dr. Mowll: KM. Excellent, Robb, thank you so much.

Robb: Thank you!

Dr. Mowll: All right.

Robb: Thanks!
Dr. Brian Mowll: Okay, so I'm here with Razi Berry. and excited to be here with you today, Razi. You have a concept that I love, which is love is medicine. And I think this is so important for people with diabetes and blood sugar problems because we've found that there's a strong correlation with diabetes and depression, loneliness. People feel isolated.

And there's some degree of self-hatred, or they just don't appreciate themselves and feel like, in some ways, especially with type 2 diabetes, not so much type 1 but with type 2, that they've brought this on themselves, and they sort of deserve this outcome. And I think that if we're going to heal, that needs to change.

Razi Berry: Absolutely.

Dr. Brian Mowll: So let's talk about love as medicine and what that means and how self-love is so important for healing.

Razi Berry: Yeah, it's such a great question, Brian. And I love the opportunity to speak about this to your audience because I've been publishing naturopathic medicine cases for 15 years now. And there seems to be this kind of common thread underneath all of the science that we know. And it's this kind of looking away from ourselves, this not really listening to our bodies and taking care of our bodies in a way that
nature really intends us to do. And so when people first hear the term love is medicine, they’re first thinking, does this have something to do with relationships. And absolutely, yes. But it’s mostly the relationship with yourself.

So we were taking before about how a few hundred years ago people were dying of infections and childbirth and poor hygiene situations. And all the technology that we have has brought us away from that, so we should be in a really good place in our society. But what we’ve replaced with that technology is, we’re now dying from this lack of self-love.

And when I say that, it’s because blood sugar issues lead to cancer, heart disease, different inflammatory responses, autoimmune diseases, dementia, yeah, cognitive decline, premature aging. And when we look at how diseases like diabetes are so related to lifestyle, or maybe better said how we live our lives, because lifestyle had been the word Xerox or something. It’s a word that nobody thinks about, what lifestyle means.

And it really means how we live, our relationship with ourselves and with each other. And I feel like if we return to a place of love, meaning not always pampering ourselves or making excuses for ourselves because we don’t want to do something hard or because we deserve something, but loving ourselves in a way that we want to take care of our most prized possession, which is our bodies that house our mind, house our spirit. Our bodies are how we love the people around us, how we take care of the people around us. And diseases like diabetes are a perfect example of how we’re not loving ourselves well.

**Dr. Brian Mowll:** When I hear you talk about that, and I hear the word love, one thing that I think about is acceptance. So there’s, I think, something powerful about accepting where we are and then also being empowered to make changes, to move ourselves closer to what we really want for our lives. And that’s all acts of self-love, really.

**Razi Berry:** For sure. And we were talking yesterday a little bit about shame and how we can get stuck in shame. And then we feel bad, and so we keep making bad decisions. But what shame is really meant to do is a knock on the door, saying hey, this doesn't feel good. Let's please pay attention.

I mean one of the things I love about naturopathic medicine is that it really says that the disease is really part of the cure. So when you have your blood sugar changing or you’re having pain or you’re having... you’re not healing well, like wounds aren’t healing, that is your body attempting to deal with what you’re doing to it. It’s constantly loving you. And so when you build up plaque in your artery, it’s trying to repair damage that you’re doing. That’s how much your body loves you. And so instead of looking at these symptoms as something to be afraid of, we
should look at the gift that they're giving us and saying, wow, my body loves me so much, and it's working so hard, what can I do to make it easier for my body to keep my blood flowing, keep my heart pumping, keep my blood sugar where it needs to be.

I mean I think about somebody that has a really neat car, right. They're going to keep it garaged, keep it covered, put the best fuel, the best oil in it, just really pamper that car. I mean I have neighbors that do that. But we don't treat our bodies that well. And it's just pervasive in our society. And I think that really all of the neat research that we're learning is fascinating. But I feel like it's not enough to make people really make the changes they need to change.

You and I did the Sugar Free Summit project together, right, where we taught people about sugar addiction. They learned what kind of addiction they had and how to deal with it. And we talked about all the many reasons why... we know all of the reasons why we shouldn't eat bad food, processed food, refined sugar.

And yet the science doesn't seem to be enough to make people wake up and make the change. So love as medicine is about digging deeper into a relationship with yourself and how to really take care of your relationship with yourself the way you would take care of your children or an heirloom that was passed down to you, because that's kind of what your body is.

**Dr. Brian Mowll:** So self-love isn't treating yourself to ice cream, although it could be. But it's really about honoring yourself, your body, respecting your body, respecting yourself, and really doing the things that are going to treat your body in a way that shows how much you really love and want to care for it.

**Razi Berry:** Yeah, and ice cream, for example, do I ever eat ice cream? Sometimes, but the best way to eat ice cream is when you’re at the farmer's market, and you see some amazing peaches. And then you buy some local milk from a farmer, and then you go into your kitchen and you’re with your family or someone you love or just by yourself, and you enjoy the process of making some ice cream.

That’s, I guess, how nature would intend you to enjoy ice cream. Not to run down to a store, buy a carton of something that you have no idea what it's really made of or how it was manufactured – because it's manufactured – and then you just eat it in a hurry or while you're not paying attention. You're just watching TV. And you're not even present with the ice cream. And you can still go to a local ice cream shop and stuff. But it's like we're not present. We're just sort of numbly numbing ourselves. And we're not even embodying that experience.
Dr. Brian Mowll: Yeah. So what are a few ways that someone who’s listening to this right now could start to express more self-love in reference to their health and diabetes and blood sugar?

Razi Berry: For me, what works the most is to really get out of my head and just my thinking self and get more into my body. One of my favorite people is the late Candace Pert. She was a researcher that discovered the opiate receptor.

And so when she discovered the opiate receptor, she realized, well, if we have a receptor in our body that can take in these opiates, then since we’re born with these receptors, we must have an endogenous or self-made manufacturing process for these hormones and neurotransmitters that make us feel really good. So then she further discovered that these are in our whole body not just in our brain. So she says, your body is your subconscious mind. And that really struck me because we really do think with not just our brains but our whole body.

So the best way to start loving yourself better is to really be mindful of how your body feels. There is a term in science called interoception. And interoception is like a sense we have, like sight, smell, taste, touch. But it’s a way to feel or sense our internal body systems. An example of that, there’s a term called mittelschmerz. And it’s kind of a German word. And it means middle pain.

But it’s a term used for when women can feel themselves ovulate. Now all women can do that, but we've kind of lost that over time, right. But it was kind of an old fashioned way. Women didn't have ovulation, ways to measure that, so they would feel the mittelschmerz. So I've really, in the past few years, been really tuning in on how to increase my interoception, my interoceptive sensitivity.

And so I try to really, wherever I am, remember to take a moment and notice things. Like okay, right now I feel the air conditioning come to this side of my body. So I feel a little cooler here. And I feel the comfort of the pillows behind me. And I feel the ground kind of holding me at this. I’m sitting in my chair. And when I'm cooking a meal I listen to the sound of slicing the onions. And I look at the brightness of the colors. And I try to really focus in on my senses. And when you really focus in on your five senses, it helps you develop your sixth sense.

And then you listen to yourself. So when everything that you do or say or people that you’re around, you know if it’s something you should be engaging in or not. And when you have a better sense of that interoception, you also have a better gauge of how your body feels while or after you're doing something. So if you’re eating something that you think is fun, and you’re enjoying it but you really get in touch with feeling your body, you’ll notice that you feel bloated, or your stomach hurts, or
you get a headache, or your thinking's a little foggy.

And you start to not really desire that anymore because the feeling good in your body and the feeling clear and the kind of stronger intuition that you have trumps the taste of those doughnuts. And so it's by really engaging your senses and getting to learn to listen to your body, it helps you make the right decision for you, which usually is the decision that's loving yourself. And that's the best practice to start with.

**Dr. Brian Mowll:** We talk a lot about mindfulness. And the way you describe that, I think, is a good description of what it's like to be mindful and to live fully in that present moment, fully experience that. And I think even if you're going to choose to eat a food that maybe isn't the best thing for your blood sugar, isn't low carb, for example, or maybe has a little bit of sugar or something, a treat, I think you should do it and be fully present and really experience that, both the joys of it and then also, if there are consequences, experience those fully also. And then maybe we can make a different decision next time.

**Razi Berry:** Yeah, I think that's really well said. And I'll add to that, when we say mindful, we don't just mean mindful of what our thoughts are. We're mindful of the whole experience of our body.

**Dr. Brian Mowll:** Mind and bodyful

**Razi Berry:** Yeah, mind and bodyful.

**Dr. Brian Mowll:** So diabetes as a gift, type 2 diabetes as maybe a blessing.

**Razi Berry:** As a message.

**Dr. Brian Mowll:** As a message, talk a little bit more about that.

**Razi Berry:** So I've said this before, but there's a quote I love, by Rumi, that says, “The pain is the solution to the pain.” Our mutual friend, Dr. Charlie Crossley, he says, an example of this is people, let's say, they go out. They have fun. They imbibe in some cocktails. And the next morning they wake up with a bad hangover.

And people say, well, what's the cure for the hangover? Well, Charlie, and in the naturopathic philosophy, will say well, the hangover's the cure for the hangover. The symptoms you're feeling are your body's attempt to clear the liver, clear the blood vessels. You need hydration. It's sweating out and purging of toxins.

So that discomfort you're feeling is really your body loving you. When we continue to do these, make not the best choices, which can lead to
things like diabetes, that message becomes chronic and kind of gets deeper into the tissues. And so that's how the lack of self-love can kind of go from an acute situation to a more chronic one. I think I didn't answer your question.

**Dr. Brian Mowll:** I think it's that the pain is really the cure, in a lot of ways. And it's the message. It's telling us something. It's your body's way of letting you know that something needs to change. We need to make some adjustments. Yeah, and we have to listen to that, right.

**Razi Berry:** Who you are right now, what you're feeling and experiencing right now, is just an accumulation of what you said and did and ate the day before and the day before and the day before that. So the beautiful thing about it is, this message, right now you can listen to what that message is, and you can make that change right now. And tomorrow you'll be a little bit more healed, and the day after that and the day after that, just by those little acts of loving yourself.

**Dr. Brian Mowll:** And that's really empowering because it means that we have control over what our life is going to look like and our health is going to look like and our blood sugar's going to look like and our weight is going to look like a week from now, a month from now, a year from now, five years from now. So it's powerful.

**Razi Berry:** Taking this master class and learning from all these experts is an act of self-love. And it is empowering because I'm sure many people watching us right now, Brian, have gone to someone about their blood sugar. And they're just given a prescription. And it doesn't address how are you feeling about having this diabetes? What do you feel empowered that you can change? Where do you feel stuck? And this master class really gives people those answers.

**Dr. Brian Mowll:** Beautiful. Razi Berry, thank you so much for spending some time with me. If people want to find out more about your work, what's the best place for them to go? And also, if you could mention your podcast, too, that would be great.

**Razi Berry:** Oh, sure. I have a podcast called Love is Medicine. It's on iTunes, Stitcher, Spotify. And you can find me on Facebook, Instagram at Razi Berry. And my website is naturalpath.net.

**Dr. Brian Mowll:** Okay. Razi, thank you.

**Razi Berry:** Thanks, Brian.
Dr. Brian Mowll: Okay, here with Dr. Peter Osborne, author of *No Grain, No Pain*. And we’re going to talk today about a grain free diet and why that’s important for not only diabetes and blood sugar but also for gut health and overall health. So the book is *No Grain, No Pain*. Why no grains?

Dr. Peter Osborne: Well there are a lot of different reasons, but as it relates to diabetes, let’s just start with a couple of different things. Number one, gluten. Not only has gluten been implicated in the cause of diabetes type 2 but also in the cause of type 1 diabetes. So whether you’re type 1 or type 2, gluten can actually trigger an autoimmune response that can lead to either one of those types of conditions.

So that’s from a gluten perspective. Of course gluten can also cause leaky gut, so it can basically rip a hole in your gut, microscopic holes, which then allow for bacterial waste and other types of compounds to leak into your bloodstream and create chronic inflammation. And of course if you’re trying to battle diabetes, and maybe you’ve already got a diagnosis, if you’re trying to battle it, you’ve got to get inflammation under control.

So if you’re eating grains and you’re constantly creating inflammation, what that does is it elevates cortisol. And your cortisol causes weight gain. It causes water retention. So again, if you’re trying to fight diabetes,
you're trying to lose weight, most likely. You're trying to reduce the inflammation, reduce your risk of heart disease. So we don't want to eat a food that's going to be promoting of that inflammatory process long-standing.

But then some people say, okay, gluten aside, right, what are the other things in grains? Why would we want to cut grain out? One of the biggest reasons is the carbohydrate content, very, very high carbohydrate, especially grains like wheat, which have a greater insulin response than sugar. So if you're eating your Weet-Bix or your Wheat Chex or whatever it is that you like for breakfast cereal, you're not only getting a heavy dose of carbohydrate through that dairy that you're using, but you're getting a heavy dose of carbohydrate through that grain based cereal item.

And then there's another big one that I think it's maybe important to mention. It's the omega-6 omega-3 ratio of grain. When you eat a lot of grain, it drives up the omega-3 fats. Now omega-6 omega-3, for those of you listening who don't know, omega-3 fats help our bodies cope and deal and adapt with inflammation in a healthy way. They're also very critical for brain health, cognitive function.

So when you eat a lot of grain, you're actually not eating very much omega-3 at all. There's virtually little to no omega-3 in grain, but there are large quantities of omega-6 in grain. And omega-6 is promoting of inflammation. So going back, again, to what we talked about with gluten, gluten promotes inflammation. High levels of omega-6 promote inflammation. So it's very, very hard to overcome a diabetic situation if your body is being inflamed every time you eat.

Dr. Brian Mowll: So most people are told by their doctors and their dietitians to eat things like oatmeal because of certain fibers and so forth, I guess trying to lower cholesterol. And they are, I guess, considered a little bit more stable than the processed refined grains like breads and other forms of food. But what you're saying is that even whole grains like oatmeal, like oats and wild rice and so forth, those can be problematic as well.

Dr. Peter Osborne: They can be. And generally speaking, a lot of people say, “Well why would I go on that diet? It seems so restrictive and so hard.” What I would encourage everyone watching today is to get with a really solid functional medicine practitioner and get properly tested because one diet fits all, that really doesn't work. It never has. Of course I've written a book with a diet plan in it.

But it was more to get information and the word out about what grain can do. But there's testing that can be done that can help you isolate whether or not you have a gluten sensitivity, whether or not you're
reacting to grain, whether or not you’re reacting to other specific foods that could also be promoting of inflammation.

And I think it's very, very important no matter who you are that you understand that your path to recovery from diabetes may not be the path of your neighbor, right, and that everybody is uniquely different. There's a term, biochemical individuality. It was coined by a famous Nobel prize winning biochemist, Roger Williams, who wrote about this in the 1950s. So almost 70 years ago this scientist was talking about functional medicine, right, 70 years ago before the term functional medicine even existed.

**Dr. Brian Mowll:** Right. So a common denominator here is inflammation. And we know that inflammation leads to cell damage. It deals to problems like vascular disease, dementia, Alzheimer's disease. We know that it is also one of the things that starts insulin resistance, which then leads to higher insulin levels and can eventually lead to diabetes. So what are some of the other things, other than grains perhaps, that contribute to inflammation?

**Dr. Peter Osborne:** So let's talk about some of the other things in grain maybe, and then I'll talk about some other things too. So one of the things in grain, commonly found in grain, is mold. It's a very big problem. The way that grain is farmed in our country, it has to be stored. And mold tends to grow in it. And a lot of people are allergic to mold.

One of the things I do very commonly is test all my patients for mold allergy because if they're mold allergic, they could be responding and reacting to grain. And it has nothing to do with gluten. It may not be gluten sensitive, but they may be mold reactive. But mold also produces a metabolite called a mycotoxin. So think of it as mold poop. It's like the mold creates a chemical toxin compound that also creates inflammation. So a lot of grains are very, very heavy in molds and mycotoxins.

Then you have pesticides, like glyphosate. And this is not exclusive only to grain. There's glyphosate in a lot of products. And there are a number of studies that have been coming out recently, for example, where we're finding a lot of mycotoxins in cereal-based products. We're finding mycotoxins even in non-cereal-based products. Wine's a great example of heavy, heavy mycotoxin concentration.

A lot of people, even with diabetes, like to enjoy a glass of wine because their cardiologist said have a red glass of wine because it's heart healthy. And they don't realize they're getting... not only is it going to drive up their insulin, but it's also going to expose them to that pesticide, which glyphosate itself can cause inflammation. It can cause mineral deficiencies, like selenium deficiency. It can interfere with your serotonin metabolism, so it makes people depressed. It can. And it can also slow
down the gut because the gut needs serotonin as a chemical to have proper bowel motility or movement, so the movement of the gut. So glyphosate and other pesticides can be highly, highly inflammatory.

Then a lot of diabetics, because they don't just develop diabetes, it's not just like hey, today I have diabetes, and yesterday I didn't. It's a very, very slow steady process of damage, accumulation of damage over time. And then they finally get a diagnosis. But before that a lot of them have already had a diagnosis of high blood pressure. They've already had a diagnosis of other types of things, like high cholesterol, even though we won't talk about cholesterol.

But I have a total different belief system than most people on that. But they're on medicines, right. Drugs like the diuretics for blood pressure medication or ACE inhibitors or angiotensin blockers, receptor blockers, these drugs cause CoQ10 deficiency and zinc deficiency and B vitamin deficiency. And so when you don't have adequate quantities of these nutrients... for example, we use CoQ10 because metformin, which is also a medication that a lot of diabetics are prescribed, also causes CoQ10 deficiency.

Well, CoQ10 deficiency causes congestive heart failure, causes elevations in blood pressure, reduces the body's ability to fight inflammation, so therefore increasing inflammation. It's an antioxidant. So a lot of people that have gone through that route of multiple medications before they hit their diagnosis of diabetes, they're on these medicines that are creating nutritional deficits, that are supporting higher levels of inflammation in their body, not even aware of it.

**Dr. Brian Mowll:** So what do we do to counteract inflammation? Are there some natural strategies with maybe foods? Are there some things that can be done through botanicals or supplements to help reduce inflammation?

**Dr. Peter Osborne:** So both. I think, first and foremost, food has to be the most important thing that you do because if you're eating inflammatory foods on a regular basis, you can take all the botanicals in the world, and it's kind of like spraying a water hose on a fire. And on the other side you're spraying a gasoline hose. You're not really going to win that war if you're adding fuel to the fire. So you've got to really get food dialed in. And so that's different for different people. Get a functional medicine practitioner. Get testing done. Find out which foods for you are acting as inflammatory mediators. But beyond that, eat real food.

There's a common sense law. The take-home message, if you will, today, is just eat real food. Don't eat processed packaged food with lots of dyes and additives and preservatives and other things in them because a lot of those are actually inflammatory too. So just kind of a common sense
rule of thumb is eat food that is real, that is grown out of the ground. Or eat grass fed beef instead of feedlot beef. Eat free range, organic chicken instead of feedlot chicken. These are great places to start without taking pills or supplements and other things.

Now if you really want to take something in a concentrated way that can really be effective for reducing inflammation, things like curcumin can be very effective, high doses of omega-3 fish oil. When I say high doses, three to five grams a day not one fish oil pill that only contains 200 milligrams of EPA or DHA. I’m talking about concentrated doses of those things can be very, very effective at mediation of the inflammatory cascade.

And then one other thing, I think, that's very, very important is – and I keep saying this – go to a functional medicine doctor, because as a diabetic I don't think you should be doing it alone. I think you should reach out, just like people are reaching out for your class and they're finding a community where they can find that kind of help. But reach out and ask a functional medicine doctor to test your nutritional levels, your vitamins, your minerals, because a deficiency of vitamins and minerals can actually make it very, very hard for your body to put out fires, to calm the inflammation. So I think those things should all be priorities.

**Dr. Brian Mowll:** So if people want to cut out grains completely out of their diet, one of the concerns is, where do I get my minerals, where do I get fiber, because those are two of the things that I think are promoted heavily with a grain diet. So what are other good sources of micronutrients like minerals and fiber?

**Dr. Peter Osborne:** Vegetables, I mean very simply put, vegetables. Most people don't eat vegetables. They eat grains, and they call grains vegetables, and they have high doses of grain, which are really highly glycemic and don't really create a benefit for them. But vegetables. And you name it. There are about 200 different varieties of vegetables that we have available, depending on what seasons it is. I encourage people to eat with the season. So when the spring squashes are here, eat them. When the fall squashes are here, eat them. When the summer berries are here, eat them. Spinach, chard, arugula, beet greens, mustard greens, you name it. There are lots of vegetables that contain lots of fiber and also lots of micronutrients.

Now one of the most micronutrient dense foods of all foods is organ meat. I mean a lot of people throw that away, or they go to the butcher and they buy the meat, but they don't eat the organ parts. If you buy a chicken, usually there's a little bag stuffed in the hollow cavity of the chicken. And it's got the gizzard, and it's got the heart, and sometimes it even has little bits of liver. And oftentimes people throw that away or feed it to their dog. But it's one of the most nutrient dense tissues you
could eat. So pound for pound, calorie for nutrient, organ meat is one of the most nutrient dense foods.

**Dr. Brian Mowll:** Very interesting, wow. Well this had been great, a lot of powerful information. And I want to thank you for being here, Dr. Peter Osborne. The book is *No Grain, No Pain*. So where can people find that and more information about what you're doing?

**Dr. Peter Osborne:** So they can find *No Grain, No Pain* at any major book retailer, Barnes & Noble. They can find it on Amazon. They can actually even get a copy on Audible, if you like audio books. And if you want to come learn more about our message and what we promote, it’s glutenfreesociety.org.

**Dr. Brian Mowll:** Very good. Dr. Peter Osborne, thanks for being with me today.

**Dr. Peter Osborne:** Thanks for having me, Dr. Mowll.
Dr. Mowll: Okay. So I'm here with Nina Teicholz, who is the executive director at The Nutrition Coalition, and an adjunct professor at NYU. And today we're going to be talking about, really the nutrition guidelines and some of the data behind them, how they're evolving and changing. You're, actually, a big part of that, I think. And you know, what we need to do to move forward. To help these become more useful, I think, is probably a good way to put it. So maybe just share a little bit of the history of the US Dietary Guidelines and how we ended up with what we have.

Nina: Well, it's great to be here. Thank you. The Dietary Guidelines began in 1961, really, with the American Heart Association because they were the first organization anywhere in the world to tell a population / the American population to cut back on saturated fat and cholesterol, meaning mainly cut back on animal foods in order to protect yourself against heart disease. That's story of insulin keys behind that, many people I'm sure your listeners and viewers know that. And then the US government got into the picture in 1980.

And that's when they launched the US Dietary Guidelines that are currently sponsored by the USDA and HHS, which are two government agencies. And they pretty much just adopted the whole American Heart Association platform, which was at that point anti saturated fat, cut down on your dietary cholesterol, no egg yolks for you, no shellfish, and
also low fat. Like, cut down all your fat. That was the thinking in 1980. And there was the food pyramid that many people still remember which was that big bottom slab was, you know, grains and breads. And at that point, it was like eat seven to 11 servings of bread a day. And you know, the whole idea was to try to increase your carbohydrates up to 50 to 60% of all your calories. Because Americans in 1965 had been eating about 39% of calories is carbohydrates.

According to our health experts, we really needed to hike up the carbohydrates. Well, 1980, year the dietary guidelines are founded, is the same year that the obesity epidemic/obesity in America going along like this, boom, starts to climb up dramatically and rapidly, and diabetes a little bit after that. So you can't say that the guidelines caused that, but there's quite a lot of evidence to build the case that having everybody increase their carbohydrates since 1970, 30% while reducing fat, because if you cutting out fat, you have to replace it with something usually it's carbohydrates.

All of our increased calories that we eat now are carbohydrates. And, you know, an easy way to understand this; what do you do to fatten cattle, you feed them grains. What do you do to fatten people, you feed them grains, lots and lots of grains. And so this is basically the high carbohydrate diet that was given to America, completely changed our whole food supply. And now we are really seeing the consequences of that.

So I just got involved because I wrote a book called The Big Fat Surprise, and it was all about the kind of the history of nutrition recommendations. And I spent nearly 10 years diving into the science and understanding all the clinical trials, and I went to the evidence base for the dietary guidelines that we all follow. And it was just shocking. I was like, “Well, where are all the studies that I've been looking for, where are they?”

You know, NIH funded billions of dollars and taxpayer money meant to inform nutrition policy, they're not there. So all that led me to want to try to reform our dietary guidelines so that they are evidence based. You cannot ignore the randomized controlled gold standard clinical trials.

And I wanted to have guidelines that would, you know, at least cause no harm, like at least let's not have recommendations that are potentially making people fat and sick, right. I think many of your viewers or listeners might think, well, that's okay. I've fixed my health fixed the health of my family, we're okay. So what do we care about the guidelines? And that is really the way that I kind of felt myself, you know, my kitchen is good.

But the reasons to care about the guidelines even for those of us who
are you know, or fixing your own health are, the guidelines turn out to be, as I discovered, really wildly powerful. You know, school lunch meals, what your kid is getting in school, or what you get when you go to a hospital; you're trying to get better and they're feeding you bread and soybean oil.

What you get in elderly parent or relative in a nursing home, all that's based on the guidelines. What women and infant children are getting, they're getting those food baskets for the most vulnerable populations, those have no animal proteins in them anymore. That's all being driven by the guidelines.

The military; we have a huge obesity problem in the military. The military eat but what they eat is based on our guidelines. And you know, they currently have a system that try to decrease obesity in the military, based on our guidelines. You know, the big red, don't eat is above meat and the big red green, do eat is above the pasta dish, you know.

So is that going to help reduce obesity in the military? Not from any of the science that we know. You know, every time you think about food package, and you look at the label on the back, you're like, oh, I want to make sure to hit that saturated fat cap. And those percentiles on the back of every food package, that all comes from the guidelines. So they're just so hugely powerful.

Dr. Mowll: Yeah. And then you have groups like the American Diabetes Association that then falls back on the guidelines too, they may have some of their own guidelines and change them a little bit. But, you know, a lot of it is still based on the general United States guidelines.

Nina: Yeah. All the medical professionals, you know. So we're taking dietitians, nutritionists, nurses, doctors, their professional organizations have largely just downloaded the guidelines. That's what doctors are taught in medical school. So, you know, many of us have these experiences. Like, we feel great, our cholesterol markers are great, we've lost weight.

And then you go to your doctor, and your doctor is, “Well, be careful on that dangerous fad diet because it's not the gold standard dietary guidelines.” So what I did as part of my work for an article that ended up being published in the BMJ; British Medical Journal, was to really look into the actual evidence based for the guidelines. And I mean, it was shocking what there was not.

There's one clinical trial, they say, to show that any of the dietary guidelines can help fight obesity. And then it was like a trial that lasted two years with six pounds of weight loss after two years. I mean, that's not very convincing. What do you think the number of trials they could
say randomized control clinical trials to show that their guidelines could prevent diabetes? The answer would be zero. They had zero clinical trials on diabetes. So it’s, like where’s the evidence for them? Why are they considered the gold standard? And why is my doctor following them if they’re not the gold standard? I don’t even think doctors realize how little evidence there really is behind them.

**Dr. Mowll:** I don’t think so, either. Yeah, it’s interesting. So your group, Nutrition Coalition, is trying to bring education and real change.

**Nina:** Yeah, so we’re a non partisan, non profit, do not receive any industry funding, totally funded by our members, mainly people who have recovered their health by ignoring the guidelines. We are trying to educate policymakers in Washington DC about the need for change. You know, they’ve been told this story. This is the story like the reason America’s fat and sick is that people don’t follow the guidelines. You know, they’re too fat and lazy, and they eat too much junk food and they don’t exercise enough. But as a journalist, I actually went in and looked at, like, where’s the data for that? It turns out, there’s no data to support those ideas.

If you go to our website, which is nutritioncoalition.us, we have a bunch of charts showing Americans in every possible food category, are like 100% follow the guidelines. You know, red meat down 28%, whole milk down 79%, animal fats down 29% since 1970. Grains are up, we eat more grains, we eat more fruits and vegetables by 20-30% up. So we’ve done an excellent job of following the guidelines.

**Dr. Mowll:** So it’s not a compliance issue, really.

**Nina:** It’s really not a compliance issue. And it’s like the military makes obvious that it’s really not about an exercise, right. And actually, over 50% of Americans now meet the government’s exercise target guidelines, compared to 40%. Yeah, like 15 years ago.

So like, we actually do more exercise, too. So this story that it’s Americans are to blame for their diseases, nutrition related diseases, which is what everybody has heard in Washington for decades. You know, we’ve come in and we’ve said, that’s not the story, not supported by the evidence. Let’s stop blaming Americans, maybe it’s something about the advice that we’re giving them.

So again we’re also trying to work the process so that like the next guidelines are better based on more rigorous science. You know, really our belief is, like wherever that science leads we will follow. But we just want it to be reviewed in a rigorous way according to state of the art systematic methods, we just want it to be reviewed properly.
Dr. Mowll: Nina Teicholz, thank you so much for being here. The book is *The Big Fat Surprise*. And the website again?

Nina: My website is ninateicholz.com. Good luck spelling that. The Nutrition Coalition is nutritioncoalition.us. So either of those places.

Dr. Mowll: Yeah, check it out and support it if you can.

Nina: Absolutely.

Dr. Mowll: And I'm sure you'd appreciate that, as I would. So, Nina, thanks so much for taking some time with me today.

Nina: Thank you for having me.
Dr. Mowll: Okay. So I’m here with Niki Gratrix, who is a functional health practitioner. And we’re going to talk today about stress, and maybe little known causes of stress that can be impacting blood sugar and overall health really, I think things that don’t get enough attention. So maybe just talk a little bit about stress and how it affects our overall health and possibly blood sugar, and then we can go a little deeper on some of the roots of that stress.

Niki: Yeah. I think most people are probably aware about how much stress impacts our biochemistry, and how much stress has a huge impact on our health. And very specifically, in terms of blood sugar, if we are constantly in a state of stress, we know where it’s stimulating the stress systems, our cortisol is high all the time that’s raising our blood sugar level. And that will directly lead to blood sugar issues, but sugar control issue is outside of what we do on the diet.

So it's a major contributing factor. And the issue is that when we talk about the word stress, which is wildly overused word, most people think of stress as taking the kids to school, having too many emails to deal with, just you know, the day to day stresses.

But actually, the cause of most stress is a little bit deeper than that. And the biggest cause of most stress that people have, is actually set up in childhood. And people don’t realize that early life stress -- actually, when
our brains are still developing, as the body is growing, and our brains are still growing, it's very imprintable. So stress that occurs in early life actually gets imprinted on the brain. And we are kind of primed or we're wired to have a stress response. So we've had a lot of early life stress, and we'll talk about what do you mean by that. We'll go into that. But just in terms of the mechanism, if we have early life stress, we're literally building neural pathways, and changing the epigenetic expression of things like the glucocorticoid receptors in the brain, which is what it takes to cause a stress response.

So if you had an early life stress, it takes less of a stressor to cause the stress response. So our threshold is lower, basically. But what do we mean by early life stress? Well, it's actually also called developmental trauma, early life stress. And it's things like parents separated or divorced, which is obviously incredibly common. Things like physical, sexual, or emotional abuse.

There are also things like physical and emotional neglect. I think we have an epidemic of emotional neglect. By the way, just not being seen and validated emotionally, which is often the source of a lot of shame and loneliness, which is also a massive epidemic going now, as well, which we know is also correlated with negative health outcomes. And it's also things like substance abuse in the family, and things like domestic violence.

It's actually all things; early life stress and developmental trauma, the majority of it is all our relations with OP, Other People. So it's all like relations with parents, authority figures and key caregivers, basically. So a lot of people that might think of trauma as kind of -- it's things like maybe having a hospitalization for an illness, which is very traumatizing for a child or a car accident, or being in maybe a catastrophe, some kind of weather event, for example, that's actually extremely rare.

The vast majority of people have had this type of early life stress. And what the research shows, first of all, is that 67% of all adults had exposure; 67% of all adults, have actually had exposure to one of these types of early life stress. That was probably an underestimate, because it's very hard to self-report. If you've had emotional neglect as a child, it'll always ask you that question.

And the statistics really are phenomenal. Like, the higher level of early life stress that you have, you have a dramatic increase risk of seven out of the top 10 causes of death, you have a 400. If you have just four of those, the categories that I mentioned, you have a 400% increase risk of things like developing depression, or Alzheimer's, and the mental health issues that we see. If you have six of them, you have a 20 year reduction in lifespan. And that was based on huge studies by the CDC and Kaiser Permanente of 17 half thousand adults. And they started those studies
in the mid 1990s. So we know that it has a major impact. The other thing that's very interesting is, it's becoming more understood about things like PTSD, Post Traumatic Stress Disorder, that's actually not the same as developmental trauma.

So PTSD is something we have learned to have a stress response to but it's normally to a discrete event that happens. What's very interesting is that, if you have developmental trauma, like you didn't have the connection, the social connection to self that you learn from mirroring, from the key caregivers around you, you're much more likely to develop PTSD in response to inevitable events that happened or negative.

So for example, the soldiers that went to the war zones, they looked at who developed PTSD, and who didn't. And it was always the ones that had early stress that developed the PTSD. The developmental trauma, it's very much to do with how we connect with ourselves and how much self-love we have, how much that we feel at home and connected to ourselves. And that's really the ability to have resilience and to have good self-care practice. We learned that through being mirrored by our key caregivers.

So in adulthood, how you respond to stress, so you can be more primed. If you've had a lot of early life stresses, you're more likely to have a bigger stress reaction to smaller stressors in adulthood. And it's actually neurologically based because it has actually changed the neurology. And we're much more likely to not have resilience if we have this early life experience.

Dr. Mowll: Now, if someone is dealing with diabetes, or blood sugar problems, or really any other chronic health issue, and they've ruled out a lot of the simple things; they're eating a good diet and exercising, take care of themselves. Or maybe they have these recurring self sabotage patterns, and so forth. And they want to focus more on the stress root cause and go deep with it like this. How can they connect the dots? How can they analyze, perhaps, if some early life stress is impacting their behaviors now? Are there tools, tests, things that they can do?

Niki: You know, you could even go online and just put in ACE Score. And in fact, my website might come up or other websites, where you can at least start by have a look at what the original CDC Kaiser Permanente questionnaire, it was a little superficial. I do have a much more extensive questionnaire that is asking more subtle questions that get to the deeper questions.

As I mentioned, if you just ask somebody if they've had emotional neglect, how would they know that? But when you ask people who was there for you, as a child, when bad things happen. Who kind of made sure you went to school, you know, every day that. We always call those,
like they're sort of silent trauma, so emotionally that is like silent. And it's not to minimize, obviously, if somebody happens -- you know, obviously, if you've been abused physically or sexually most of the time, but it's sometimes more subtle than that.

So do the standardized questionnaire or adverse childhood events questionnaire, ACE questionnaire, do the extended one, you can get that. No opt in or anything needed on my website, for example. So you can start there. But also it should trigger just the exploration process. So you can even go, perhaps, if you hadn't thought about this before these things, you can actually go, for example, sit with your parents. Maybe you've never asked them what it was like, what was your experience like. Maybe in the first year of life, were there any issues? And also, what were their issues? What was it? What was your mom state of being when she was pregnant with you, because that also affects you, as well? So you can kind of start this exploration.

Usually people know, as well. May be it was always thought -- I mean, start to explore and think, were there certain things that changed after certain things happened in childhood? And so often when you start the exploration process, you got to think, yeah, maybe there was something there. And there's also interesting, like personality traits, as well. So it's very interesting, like early life stress. In adults, when we have trauma, we have a state that develops and the state is temporary. In childhood, the states become traits, and they become biological fate.

Yes, so it becomes much more programmed in. And we’re looking at traits like, and we’ve all got them to some degree, but things like kind of constant overachieving or constant over giving, can also be overused where we never prioritize our own needs. And things like, we know we’re kind of anxiety type or perfectionist. And a lot of that is all making up for where we didn't get this early sense of -- basically, it’s about love, is about unconditional self-love. And it's not taught inside, you know, probably say that at least more than 80% of us do not get taught that, about self-love.

So what we do is we make up for it. So if I don't feel at my core, okay, I'll make up for it by achieving and creating huge amount of external status that validates that I'm okay. Or if I just get everything right, I'll be okay. And it’s just what message that we got from parents; if you've got overly criticized, we took it to our core existence, our identity is unacceptable unless we do everything right, achieve or give to everybody, or worry about every single thing that happens.

So there's actually a personality typing system that I use, it's widely available called The Enneagram, which is a nine personality typing system. And it's actually the type one perfectionist, type two givers, type three achievers and type six that I call the loyal types for their
anxiety types. And it's a good tool you can use, is widely available on the internet. It’s good fun as well, it doesn’t have to be heavy. But you can just start to look at what types of traits that you might have.

And that’s where the sabotage comes in, because that’s where people don’t stick to health programs and protocols, because they find themselves just not being able to stick to it. Like, they are choosing consciously one thing, and then their body does something else. And it’s often these core unconscious, core traits that are driving behavior. And actually what it comes down to is a self love deficit from not getting enough love as children, and a lot of us have got it.

So you start identifying the pattern that helps the awareness is half of it. So if you can resolve just by becoming aware of your traits, that’s so you alchemize. And then when you are -- it’s this knack of learning when you do see yourself sabotaging. Or you see these traits, or you see things that may have gone wrong, and you sense that that’s going in your brain. Learning that you also need to have total self-acceptance, non-judgmental, self-love, that’s where starts not that it stop there. Because we can start getting judged, we can become judgmental by the fact we notice we’re a judgmental person. And it’s like, that’s not breaking the spiral. Somewhere, you got to start saying just be able to get that knack so. So that’s some of the basics that people can do just to start to explore.

The good news is that we haven’t covered -- the good news is everything we said about the brain gets kind of trait wired for stress, and the epigenetic shift. That can be reversed, that can absolutely be reversed. It’s just that these positive states of feeling and also the kind of behavior that drives, we need to cultivate that. So we need to cultivate the positive states and most of us don’t; we just get on with life and then kind of don’t address the fact that to retrain the brain. And to stimulate the vagus nerve, which is the rest, digests, detoxify, calming, healing, lower the blood sugar, balance the blood sugar side of the autonomic nervous system. We need to just start to bring in a practical daily kind of subtle way of life, it becomes a lifestyle, and there’s so many ways that we can do that as well.

So stimulating the vagus nerve on a daily basis is a really important part of this reprogram, changing the epigenetic genetic expression. They’ve shown that even just one session of meditation changes the genetic expression of thousands of genes, just one session. So imagine if you do this on a daily basis, and if you just got to pick the things that you like doing and build them into your life.

And when you start noticing you’ve got the traits that are sabotaging it, bringing that into the awareness and then bring that into self-love. And then you’ll slowly make these changes. And just so that people know the
other ways you can simulate the vagus nerve. There’s so many ways; 30 or 40 different ways that are very accessible and practical. And it’s the things that we know -- you know, people know about meditation, breathing is wonderful; deep belly breathing, deep breathing absolutely stimulates the vagus nerve.

Things like QiGong, yoga, exercise, well, even things like fasting actually, which is interesting. There are a few biochemical things, laughter watching positive TV, uplifting things, positive social relations, gratitude journaling, loving kindness, meditations, time in nature, lots of things. Things that you love to do; maybe you went out, you have a hobby and you feel like you go into the zoo.

There’s so much, but it’s just -- there’s absolutely hardcore research that when you do things that stimulate the vagus nerve, you raise heart rate variability, which is the measures of stress. Raising heart rate variability is the good side, so we want high heart rate variability. It will be helping you to rebalance that nervous system, especially if it’s been a trait that got patented in. We need the daily sort of repetition of that. So it’s this sort of basic lifestyle, kind of build your life, build these things into your life, basically, if that makes sense.

**Dr. Mowll:** So much powerful information here. If people want to get that quiz to find out maybe deeper understanding of their childhood traumatic events, or just learn more about your work and what you’re doing, where’s the good place for the them?

**Niki:** Just come to my website, which is nikigratrix.com.

**Dr. Mowll:** Niki, thank you so much for being here and sharing this time with us.

**Niki:** Thanks so much, Brian.
Dr. Mowll: All right. So I'm here with Mike Mutzel, High Intensity Health. And we're going to be talking today about fitness and exercise and diabetes. And we were just talking a few minutes ago about insulin resistance. And you were sharing with me how the muscles in the leg actually become insulin resistant first. Of course, the muscles in our lower body are huge. So can you talk a little bit about maybe how we can improve metabolic health by building muscle through exercise, supplementation? And what are some of the best ways to do that?

Mike: Yeah. Dr. Brian, it's a wonderful question. I think a lot of people kind of underemphasize the role that skeletal muscle plays in like blood sugar metabolism. We focus a lot on, you know, people are interested in fasting, and that's great. I'm not anti fasting I fast a lot myself, diet and everything like that. But we realized that, when we really utilize -- I mean, muscle is basically an insulin, glucose and leptin sponge.

Okay, so the more lean muscle mass you have, the more fat you burn at rest, the more glucose you can deposit after a meal, and the more insulin sensitive you are if the muscle is healthy. So you bring up a really good point. And researchers have kind of figured out using controlled different studies where they can radioisotope glucose and insulin, and injected into diabetics.
And what they found is that the muscles in the upper body tend to not become insulin resistant, whereas if they look at the leg tissue, lower body, the quads, the hamstrings, and glutes, they become insulin resistant first. So there were some papers that are circulating around. I think, researchers in Finland and Sweden, parts of northern Europe have figured this out. There's like I think four papers now in human, so this is not just like a mouse model study.

And I was talking with Dr. Ben Beckman about this. And I think it kind of stems from usage, like the legs. Humans, we think of hunter-gatherers, foragers, were on our feet a lot moving around, when tribal community is looking for food or creating food in the garden, or what have you. And so many of us, as you know, we're sitting around.

We're on our couches watching TV, we're Instagraming, we're messaging, we're on the bus, the plane, the train the car. So I think that's a big part of it. But if we look at diabetic neuropathy, that happens in the leg first, generally. You see kind of the reddish discoloration, and people get their legs amputated. So it could be to the proximity from the heart.

So long story short, and I'm sure you can attest to this, a lot of my insulin resistant clients that I work with, some of the men they still work out. They only do upper body. They have these skinny little legs, and they say, “Oh, I used to squat in high school and I played football. But I haven't done that for 20 years.” And it's like, we need to encourage people to just get out there and walk, move their legs. I love squatting and deadlifting. And you don't need to have a fancy gym; you can do air squats, you can do one-legged deadlifts in your hotel room.

So I just encourage all people, whether it's preventing diabetes, overcoming insulin resistance, or even keto adapting to really kind of exercise their legs. And you can hit the legs several days a week, you know. And like I said, it's great if you belong to a gym, but a lot of people, they live in the country, they have four kids, they don't have time, totally get it. You can get creative and do this stuff at home, which is pretty cool.

Dr. Mowll: It makes such a great point in that people I think tend to focus so much on what they're eating or not eating with fasting, intermittent fasting strategies, which are all good strategies. But sometimes the physical activity, the exercise part of it gets pushed aside. Maybe people don't want to do it, or they're not sure how to do it, intimidation factor, possibly. So people walk, which is great, it's a great place to start.

But I think we really need to focus on trying to build more lean body mass, because, as you said, those muscles are a sponge for glucose. So we uptake more glucose, they have insulin receptors, we start to
become more insulin sensitive as we build more lean muscle mass. So you mentioned a few, but if you could maybe just talk even in more detail about some of the best ways to build that lean body mass, especially in the lower body, because I think we have a lot of potential to build lean body mass in the lower body.

Mike: Yeah, you’re right. I mean, it’s the other half of our body. A lot of people forget about this. So I like to focus on resistance training for most people. And that can involve getting a personal trainer. One of the certifications that I look for is a CSCS, which is a Certified Strength and Conditioning Specialist.

So this is someone that can work with you and go, “Okay, Dr. Brian, it looks like you have a little back injury or your hips are out of alignment. Let’s create exercise as unilaterally to get things working right.” They can help you come up with a program. There’s a great individual gentleman that literally he focuses on helping women develop their glutes and their hamstrings, Bret Contreras. So he has this thing called the Glute Lab. And so it’s all about lower body, right.

And so you don’t have to be a fitness model to get the benefits of his programming, you can just learn some of the exercises, many of which you can do right in your garage, or your living room using your couch or coffee table. So some of the best things that I recommend is, you know, for the whole body training at least every muscle group one day per week. And I like to break it down for clients and make it very simple, because there’s all these programs out there; there’s CrossFit, there’s power lifting, which I personally do.

But upper body pulling lower body, upper body pushing, lower body pushing. So you just basically split in kind of the plains of your body, cut your body in half horizontally and in the central plane. And so upper body pressing would be like the chest, would be shoulders.

Lower body pressing would be more front of the body, so quad dominant type stuff. One-legged squats, pistol squats. I know a lot of people have knee issues with age and arthritis. But once you start moving -- arthritis, a lot of people think it’s how much weight you’re carrying, like overweight people have arthritis. So it must just be a mechanical thing.

But actually, when these individuals lose weight, the arthritis in their hands goes away. And so that’s what has caused scientists realize, could there be a metabolic factor here influencing the development of arthritis, and we know that leptin is involved in creating inflammation. So for the folks that don’t know what leptin is, it’s this pleiotropic hormone that is released from our fat tissue. And it directly not only does it affect our appetite and cravings, and cause us to crave junk food,
but it stimulates the immune system to create more inflammation.

So when you start to lose weight, you actually reduce your inflammatory burden, which is great. And so people with arthritis now may not have it when they start exercising. So it may not be that your joints are damaged, it could be that your fat cells are releasing this inflammatory thing that's damaging your joint.

So lose the fat, joints improve, we see that all the time. So again, splitting body parts into different days and just trying to hit everything at least once a week; you can do this stuff in your living room, garage, work with trainer if you have the resources. I like to buy rogue exercise bands. And so these are the red band, they're 10 or 15 pounds.

I mean, I have this in my suitcase right now, because I don't know if I'll have access to a gym. Just getting a pump, that's all you need; that little stimulus can drive the genes that create your muscles to become more healthier, they stimulate. You know, all the benefits of the ketogenic diet can be kind of distilled down to how ketones influence our mitochondria. Well, that's how exercise works to it, works on the level of the mitochondria.

So this isn't like something that's totally synergistic and congruent with a low carb diet and lifestyle. It's only going to enhance the diet, so we're only going to make you sleep better, which will then influence your glycemic levels the next day. So it's a big piece of the cog that -- you mentioned, people get the macros dialed in.

They get their feeding windows all that in, they're fasting all the time. And then it's like, oh, exercise, huh. Oh, I'll get to that later. And I don't know what the issue is, I think part of it is you can really lose a lot of weight by just doing diet alone. But diet plus exercise, many studies have shown this, it's not like one plus one equals two. It's like an additive. It's like an exponential effect. So I like to recommend it for people.

And what I recommend for people is do something in a group. So be friend someone that is more fit than you, learn from them, like people want to teach inherently. And so your fit friend is going to be like, “Oh, cool. Yeah, I have a gym partner. Yeah, you'll hold me accountable, I'll hold you accountable.”

Find a group class that you like. And here we are talking about how beneficial resistance training is and I am a huge fan of that. But look, if great trainings is not your thing and yoga is your thing, do yoga, do orange theory fitness. Do whatever it is that's going to get you fired up to do it. I think part of what creates exercise lifestyle is getting into that flow state.
And that’s different for everybody. Some people they chill out and forget about their problems in life and stressors; the hiking outside, cool, go do that. Like, some people say, well, cardio is bad but it’s not bad, if that’s what you like to do. And so that’s what I encourage people to do.

Get their family involved, get the kids involved, get your pet. You know, if you’re struggling to get the motivation, get a dog because your dog is going to want to get outside, just bring the dog. So I think we overcomplicate things. We create these false beliefs, like, oh, if I go to the gym, everyone’s going to be staring at me, because I don’t know what I’m doing. Everyone in the gym is like they’re busy, too. They’re going in and out.

And if you ask someone to help you, because I’ve been working out since I was 14, I’m 36 now. I used to be a personal trainer. If I see someone doing something that may hurt them, I go up and just say, “Hey, have you been working out for a while? Or have you been dead lifting?” And oftentimes, like, “No, I just learned it.” And I’ll give them a little pointer. Like, that’s just how that environment.

So if anyone is intimidated, they shouldn’t be because it’s not like, “this Die Hard, get out of my way” environment. Most people even if they’re bigger and muscular, they pretty want to teach.

**Dr. Mowll**: Yeah, and I think one of the things I heard you say really is just make it fun, you know, find something you enjoy doing so that it doesn’t become a burden. It’s something that you can actually look forward to. So in addition to exercise and physical activity and resistance training, are there any other things that someone can do to influence the health of the muscles?

**Mike**: Yeah, this is great. So this is where nutrition comes in. There are different schools of thought, there are vegan bodybuilders that swear they’re not doing steroids and everything and they’re able to put on muscle. I’ve tried every diet under the sun, we have a lot of vegetables. So in the summer, I’ve tried a vegan diet and I couldn’t build, like I started to get skinnier and skinnier and skinnier.

So we know that muscles are made of protein, and we get protein from our food, mostly animal protein. So vegans, vegetarians, you have to really be very vigilant about sprouting your beans, sprouting your grains, nuts and seeds and eggs. So I think the easiest thing is to get red meat, animal protein.

A lot of people in the fitness space, they gravitate towards boneless, skinless chicken. I have chickens myself, I like chickens, I have them for their eggs, I don’t think it’s the best quality of protein. So red meat is going to be the best bet. And so even elderly people, that’s supplement
if they don't get enough protein in their diet.

There's a group in Texas of Dr. Robert Wolf, has done a lot of studies on amino acid metabolism in young folks, elderly folks and so forth, and found that even in elderly individuals, you provide that stimulus from the resistance training, give them amino acids, and they can build muscle. So amino acids protein plays a big role.

So yeah, if you're not getting good amino acids from your diet, grass fed beef, healthy free range, pasture raised, and all that plays a big role. Then you probably want to look at supplementing with branched chain amino acids, getting some whey protein. But again, one driver of muscle proteinsynthesis is a stimulus from exercise.

So yeah, you can probably build muscle by doing no exercise, eating a lot of protein. But where's that protein going to go? What other growth factors may you inadvertently stimulate linked to cancer. So amino acids, good quality protein, and cholesterol too. So cholesterol from eggs, so when I'm training heavily -- I'm doing a power lifting competition in May. So I'm gearing up for that. I'll have like six to 10 egg yolks a day.

And actually, I don't do well with the egg whites for whatever reason. That's all, like it's funny how nutrition changes in high school and college. All I ate was egg whites, but then I learned that you know, all the nutrition is in the yolks. You're like, why would you throw out the yolk. It was such a dumb thing. I don't know what I was thinking.

So I cook up the egg yolks and pulled out the whites and give them to the dogs and add the yolks. But cholesterol, we think building muscle. We need cells, we need cell membranes, we need micronutrients for that. And so that's why I think good quality protein and a whole foods diet really helps.

Dr. Mowll: Mike Mutzel, thank you so much for sitting down with me today. If people want to find out more about you and what you're doing, products that you have available and so forth, what's the best place for them to go?

Mike: Yeah. Thanks for that, Dr. Brian. Best place will be highintensityhealth.com. I have a YouTube channel, as well, and a podcast, so folks who are interested. You know, we do videos all the time. And I would love to connect with folks there.

Dr. Mowll: Mike, thank you.

Mike: Thank you.
Dr. Mowll: Okay. So I’m here with Dr. Michael Murray, who is really a leading expert in natural medicine. And, doc, you’ve written many books, and really an authority in this area and a lot of people are interested in what can I do naturally to help control my blood sugar?

So we’ve had some discussions before. And we’ve talked about some of the root causes of diabetes. But just to start for people who maybe don’t know you or haven’t heard your message, just generally, how do you view diabetes in a way this may be different than the conventional mainstream way of looking at type two diabetes specifically?

Dr. Murray: Well, the first thing is that it’s a reversible condition. Most often when people go to see their doctor, and they’re having issues with their blood sugar and told they’re either diabetic or pre diabetic, the doctor is telling you, you’re going to be on drugs the rest of your life. I think that’s really bad information. I think information is a real great tool for anyone that has blood sugar issues, because with the right information and taking the right steps, you can reverse this condition in most cases.

Dr. Mowll: So that right off the bat is going to be really exciting to people to hear. And people have heard that type two diabetes is reversible. But then again, there are a lot of people on the other side saying no, it’s an incurable disease, it’s something you’re going to have
to live with for the rest of your life, you’re just going to have to take medication after medication. So what is the difference in perspective? Why do many doctors believe it’s not reversible, while some like you believe that it is?

**Dr. Murray:** I think our medical system is based upon treating numbers and treating symptoms. And when you treat numbers and symptoms, you're not getting at the root cause. And if you don't get at the root cause, you're never going to cure anything. And very few of drugs really cure anything, they simply are biochemical band aids that make people feel better or change a number. So the doctor feels better, but they don't really address the underlying issue. And in many cases, they're crippling to our physiology and lead to either side effects or a worsening of the disease we're trying to treat.

**Dr. Mowll:** I like that. And I think you're right on because I really believe that doctors truly believe it's not reversible, because they don't see it being reversed in their practice. You know, the tools that they have, the medications which can be important at a certain stage, they're limited, and they're not going to address the root cause, as you said. They're not going to reverse the course of the disease. They're just going to manage blood sugar; keep the high blood sugar down a bit without really fixing what caused it to go high in the first place. So let's talk about that. You know, why does blood sugar elevate? You know, where does type two diabetes come from?

**Dr. Murray:** Yeah, I think there are four key types of type two diabetics; one is that the classic, you know, thrifty gene patient where they start gaining weight around the abdomen. And collectively, these fat cells start acting like a tumor, and they want to grow. And the way they grow is they start secreting compounds that block the action of insulin, that leads to kind of feeding that tumor, blood sugar levels go up, appetite goes up.

And you get this big snowball effect of insulin resistance, turning into type two diabetes. I also think stress is a big issue for a lot of people; a stress leads to elevations in cortisol, cortisol raises blood sugar levels. And I think for many people, they don't get their blood sugar levels under control until they get that stress issue addressed.

We have issues with various nutrient deficiencies, I think can also be a factor for some people. And those are easy patients to see as you take a look at their diet and maybe do some blood work and identify some key areas of support that can be provided, it could be something as simple as chromium. I have had patients with type two type, it doesn’t happen as much anymore. But in the 80s and 90s, it was more common where you were able to just help someone get their blood sugar levels under control by making sure they had 400 to 600 micrograms of chromium
per day. So sometimes nutrient deficiencies can be the factor. The last one I think is more difficult, but I think it's probably the biggest factor, and we've talked about it, I think it's this ever increasing load of environmental pollutants.

When they looked at the data from national health and nutrition survey, they looked at blood levels of various pesticides, herbicides, persistent organic pollutants is what these compounds are termed. And what they found was that there wasn't a correlation between any single pesticide herbicide and type two diabetes.

But when they lumped them together, they looked at blood levels of all of these compounds, they showed that the higher the level of these compounds, the more likely a person was to develop type two diabetes, and it didn't matter if they were overweight or not. And that's something that we've seen in the last 10 years, especially, we're seeing more and more people with type two diabetes that aren't obese, that really aren't even overweight. So what's going on?

Well, what's going on is that these environmental toxins disrupt the cells ability to respond to insulin properly, so that means blood sugar levels are going to stay up. And that again, causes a domino effect or a snowball effect. So when they looked at data, they found that when dividing people by weight and their exposure to these toxins, that if someone was severely overweight, if they were exposed to these toxins and had higher levels in their blood, they would have a 40 times greater risk of developing type two diabetes than someone who is equally obese, who had low levels of those compounds.

When they looked at people that were thin, they found the same thing. Somebody who was thin, who had high levels of these toxins had a 20 times greater risk of developing type two diabetes than the obese person not being overweight. I'm talking about being obese, an obese person who had low levels of these compounds.

So it looks like from this emerging data that these environmental pollutants are playing a huge role in why we're seeing this epidemic of type two diabetes. It's a multifactorial condition, we have many different facets that contribute to type two diabetes; lifestyle, diet, and of course, I'm talking now environmental. So we have to approach it differently based upon what seems to be the biggest issue for that particular patient.

And there's some overlap, we always want to focus on improving the action of insulin, we always want to reduce the exposure to these toxic compounds, and we need to take steps to try and get rid of them. When someone's really overloaded with these toxins, it's a much bigger challenge than if they are overweight, because if they're overweight,
and they have type two diabetes, we can often reverse it just by helping them lose a few pounds or achieve their ideal body weight. If they’re overloaded with these toxins, it’s a much longer proposition.

**Dr. Mowll:** Yeah. And just putting yourself in a place to be able to find that as a potential cause is something that’s going to be new to a lot of people watching this. I think that one of the points you’re making, which is really important is that and you just said it’s a multifactorial process. It’s not just one thing, it’s not eating too much sugar alone, or being overweight alone.

If we look at the Western culture, type two diabetes I think is really the pinnacle disease of Western culture; it’s high stress, not enough sleep, toxic lifestyle, too much processed and refined food, disconnection from self even. You know, there’s a psychological component to what drives type two diabetes. So when we talked about finding the root cause, it really is an individualized thing. And that’s I think one of the reasons why the conventional medical paradigm just doesn’t fit with type two diabetes, and it’s never going to really make a huge impact on condition.

So using something like naturopathic medicine, natural medicine, functional medicine, as a way to work with the individual client and patient, you know, this is what you can do. And a lot of this can be done. I think you can learn a lot of this on your own and people can explore, but when you do like a workup, or when you have somebody who wants to find the root cause of type two diabetes, what’s the process look like of actually going through that and sort of honing down on. Okay, this seems to be the primary driver, these two or three things seem to be the primary drivers for your high blood sugar?

**Dr. Murray:** Well, the first thing I want to say is we have to make sure the patient really has type two diabetes. I have had patients who have struggled for years with blood sugar control; they’ve seen all sorts of naturopaths, tried different natural therapies, nothing really seems to work. When they would come to me, the first thing I would do is I do a test called the C peptide test. This tells us how much insulin they’re really producing.

I like it better than just measuring insulin levels, it tells us if they have the capacity to make insulin in proper levels. And a lot of times, in these people that have struggled with their blood sugar and they’re thin usually, it’s because they’re really not a type two diabetic, they’re a type one diabetic, just developed later on in life. And if you’re a type one diabetic, you need insulin.

So sometimes people are really afraid to get on insulin. But you know, if you have low thyroid you need to take thyroid hormone, if you’re a type one diabetic you need to take insulin. If you’re lacking cortisol you need
to take cortisol, if you’re lacking hormone you need to take over if your body doesn’t function properly. In the case of type one diabetes, you can die. So very important, I think, to make sure that the patient really has type two diabetes.

And really kind of get an accurate baseline, find out what’s really going on here. In my program, I just use a series of questions. And it sounds too simple. But each of those four buckets that I mentioned, they’re characterized by certain key symptoms or key dietary factors. So I developed a quiz to help people identify what their number one blood sugar challenge is related to.

Yeah. It’s really simple, doesn’t cost any money. And it really points them in the right direction. You’ve probably had the experience, as well, where when you talk to the patients, and find out when things really started going downhill. It’s amazing how many times that they can pinpoint when things kind of changed for them. And sometimes it’s a traumatic event, it’s a stressor that kind of was the last straw on their camel’s back. You know, one of the values of naturopathic medicine or good medicine is we treat the whole person.

So we want to approach this condition, it’s a multi factorial/multifaceted. So the more bases that you cover, the more likely the patient’s going to have a great outcome. And I really know for an absolute fact, in most patients, we can get them off their medications, or significantly reduce them at the very least, but in most cases, get them off.

**Dr. Mowll:** Yeah, I love that. And you’re so right. I’ve had a journey through my clinical practice, where at one point, I was doing a lot of testing with potential patients. And we would look at everything; organic acids, and micronutrient testing, and gut testing, and adrenal testing and thyroid test, all this. And some of those are important, there are times when those tests can be really helpful.

But as I’ve matured as a practitioner, I found that just really connecting with the client having a good conversation, and you can do this a lot through questionnaires, as well, at least as a preliminary step. But you can learn so much in a 10-, 15-minute conversation. And like you said, an experienced practitioner will hear certain things in that conversation, and you can kind of get it and I think that’s so valuable.

I think it’s a lacking art in medicine today of you know, just a really good consultation in history, so powerful. So I love the message here, because it’s a message of hope. You know, we started the conversation with type two diabetes is reversible, find out, make sure you don’t have type one. and that’s an important test to run. But if you have type two, and you’re struggling, it is reversible.
So you’ve been doing this for a long time, written a lot of books, as I mentioned. You’ve treated a lot of patients over the years. If we could just finish maybe by, you know, painting a picture for the people watching this who have type two diabetes right now, who are struggling, who don’t know where to turn, don’t know what to do. If they can get on the right track and make the right choices, what are the possibilities for the future?

Dr. Murray: You know, when you ask that question, what happens for to me is, I think back to people's lives that have been changed by getting control. And they need many times an anchor or a lever to get them to do the necessary changes. I remember once I was given a lecture in Houston, Texas, and it was on type two diabetes; how to prevent and treat type two diabetes.

And this gentleman came up, he’s first to ask me a question, and this guy was big. He was about 6'3” and he’s probably 280. And he was almost in a panic. He said, he’s just been diagnosed. And his fasting blood sugar level was like 600. You know, his A1c was like 15.8, he was in bad shape. And he just started on some medications and they really weren’t working well for him. And he was really scared, because he had two young children.

This guy was in his 40s and he was just in a panic. And he said, “Will your program work?” I said, “Absolutely.” I said, as long as you’re committed and comply, and you take steps. And within three months, he was totally cured and went from 280, down to 210. You know, the physical transformation reflected, improved physiology inside him, his insight is changed.

And one of the things that people don’t realize is how bad diabetes feels. When your blood sugar levels aren’t being controlled properly, you have more aches and pains, your brain doesn’t work as well, you’re more depressed, you don’t sleep as well. You’re not functioning anywhere near 100%.

This guy changed his life, and he felt better because of that. So you know, he’s one of my favorite memories of how this program can work or how changing your life can get your blood sugar levels under control. And that will really change your life. And, you know, who knows where this guy would have been if he would have gone the conventional route? Because we know that the conventional route, even though it addresses the numbers, it does not change the long term outcome of the disease all that much.

Dr. Mowll: Dr. Michael Murray, thank you. If people want to find out more about your work, your website, your book, your diabetes program, what’s the best place for them to go?
Dr. Murray: drmurray.com.

Dr. Mowll: Thanks for spending some time with me today.

Dr. Murray: Always a pleasure. Always great. Thank you.
Dr. Mowll: Okay. So I'm here with my good friend, Melissa Kathryn. And we're going to talk about food today and the relationship that we have with food.

I think this is an area that for people with diabetes and blood sugar problems is really important to examine and look at, because a lot of people they've heard what to eat, they've heard different diet strategies. And maybe they've even tried to follow them, but had a hard time because I think they don't get to kind of some of the root issues behind why, how they've established a certain relationship with food that they're eating. So how do you look at the idea of dieting and food selection, and so forth for overall health?

Melissa: Such an interesting question, because when we’re looking at dieting, and food selection for overall health, there's so many different ways of approaching that. And I think a lot of people go into complete overwhelm with not actually being connected to their bodies and what their bodies need, but are going off of what they read, what they were told, what they think they should be doing with the latest crazes. And so much of that is what's dictating their choices.

And what I truly believe is that everyone's body is different. Everyone's needs are different, everyone’s lifestyle is different. And everyone's actual makeup right under DNA, on the cellular level, and based off of
our childhood and our different needs, and relationships with food, again, play a big role in our choices and the needs that we have within our bodies.

And so when it comes to actually making those choices, I’m saying an advocate for being connected to what your body needs. And that is always giving you the messages and telling you if we are actually taking the time to listen. But all too often, the choices that we’re making are based off of our minds, and not our bodies, and our minds are set up to keep us safe.

So our minds only know what we’ve taught them. And if you've taught your mind, gaining weight, to lose weight, the whole dieting cycle, and if you've taught it, we eat in restriction. So we try to eat healthy, but then we end up rebelling against ourselves and overeating. And we’re good all day and then we go into these then create habits, and beliefs based off of beliefs in our system.

And that ends up dictating a lot, which is what I see so often where people go, “I’m trying to make good choices, but then I get stressed out and this happens.” And then we end up choosing, again, based off of our minds and not our bodies, because our body's response system to stress isn't, “Oh, let me go eat. So I kind of numb out and then don't do anything.”

**Dr. Mowll:** So when you have a client or you're working with a group of people who want to lose weight, what are some of the key elements there? How do they approach weight loss in general? And how do you recommend that they do that?

**Melissa:** Well, they're generally approaching it with let me go on another diet that I'm good to for a few weeks, until my mind kicks in and says, okay, here's the game that we do. And are we done with that whole dieting game. So we can just go back to our normal way of eating like you've restricted, so diets are filled with restriction. What I'm an advocate for is, one, let's actually get clear on what feels good for you. So let's start to identify your lifestyle, let's start to look at your needs, what's going on in your life. I always say where there's lack, you'll fill the gaps with food. So my entire approach to the way that we eat is, the way that we eat, I believe dictates the way that we do many things in life. And I feel that our relationship with food is very synonymous with our relationships with money, and our habits and spending.

And so when I work with clients, we look at their life as a pie. And I say, okay, we're going to really create when we're looking at your life is probably we've got spirituality, we've got sex and intimacy. We've got money, career, relationships, and your body and health. And we're
looking at those I'm going, “Where of those is the pie full?” And where are we missing, we start to connect the dots. And then I said, because the way that we eat, you know, you're not eating the way you're eating, because you're so happy with all these areas in your life. Right, we’re filling gaps. And these have become coping mechanisms, ways of dealing with life that support us that we learned at earlier times in life. Oh, I actually didn’t have the skill set to be able to deal with the loss of this family member.

So instead, I ended up eating. So every time I get triggered with that, this is my response. And when I get stressed out at four o'clock in the afternoon, or at night when all the kids go to bed, my way of relaxing and giving back to me is food. So there are these different things in place.

So when we start to identify those gaps, we're looking at a whole approach to life. And really, because I believe food is medicine, and really looking at how can we eat to facilitate and nourish my life, my beliefs and my desires and my goals for my health and my body.

So from there, I will ask my clients, I'll say, “So in what ways are you getting in the way of these goals? Now that we've mapped out your goals, now that we've identified your gaps, what ways do you get in the way?” You know, I don't. And then it's, I'm not getting enough sleep, I'm stressed out. There's so much on my plate. Everything is expected of me. I'm bottom of my list. I'm not taking time for me. I'm not prepping food. I don't have healthy things on hand. I'm just grabbing food. I'm eating whatever my kids have, you know, I'm just grabbing stuff.

And then we start to see, okay, these here are just action steps. We haven't even gotten into the mental game, now we're just looking at what are like practical things that we can just make a list of and then make the opposite. Okay, I'm eating my kids' foods, so what would support you? I'm going to prep and have healthy things on hand and get clear with myself that my kids' foods, my kids food. What is my you know, mommy or daddy’s foods? So then we've got practical things.

And then after we get into some practical things, right, because we all need those tangibles that we could do. Then we look at where did we create these coping mechanisms with food? Because there's always a root cause, we don't just always want to be sabotaging ourselves, we're not setting out going, like, “Hey, I really would love to get this like, five up to 60, 80 more pounds off, or my blood sugar's drop.”

Like, what are these things that are going on? There are other things in place we look at, like the medical. And then also we're looking at when did we start to use food to cope? When did food become our friend? And so I really encourage people, it makes you understand you a lot better
when we start to look at food and human connection. And no longer as a substance, because food is really a substance, but many of us use food to soothe and to have a response and connection with much like a human connection.

**Dr. Mowll:** So how do you feel about that? Do you think that is just part of human nature and we’re always going to do it? Or do you think that can be passed out, sort of bring some awareness to it and then you can change that relationship, so you’re not using food for that purpose anymore?

**Melissa:** Such a good question. I think you’ll, I guarantee we could all think of somebody that has no relationship with food; they eat when they’re hungry, they stop when they’re full, they’ve never had an issue with weight. They don’t think about it. When they get anxious or stressed, they probably forget to eat.

And when they do remember to eat, they’re not like, “Oh my gosh.” You know, they don’t come with a dieter’s mentality. There’s no preconceived notions around these diets or foods; they want a burger, they have a burger, they have a few bites, some fries, they are not thinking anything. So I do believe that so much of our relationship with food comes down to our cultural background.

The way I’m half Italian, half Irish, we had food, we used food for everything. We had food to celebrate, you make love -- you know, my mom is like, eat more, you could be like -- I literally feel like I’m going to throw up and she’s like, “Go, she want a cake.” You know, you’re just like, I don’t know what’s happening. But like, it’s so good. But I’m like, I need to stop.

And so food was a sign of love. Food was always you know, funerals food or they were like wedding. So I think that there’s a lot to do with your culture. And also you know, ethnically, the foods that we were really tied to goes down, again, to our DNA. It’s like, you know, if you don’t you grow up in a culture -- You know, my mom and our ancestry, it’s like wine and pastas and that’s a part of me. And there’s the Irish side.

And I see it a lot with my clients, whether, you know, their ancestors come from India or Spanish cultures. Like, there’s rice and beans and meats, and that’s a part of it. And then it’s also looking at how was food used in your household? What did you see your parents doing? If your mother was always dieting, and food was always.

And she was putting that, and you saw that with your father, or he made comments about your weight, or you saw your parents super fit, or you saw them struggling with their weight, most even being obese, you know, if that’s just what your family relates to. So I think all of these
elements come in, and then it's going, right, all the work that we do in
self development, who am I though? Who am I? What does this system
need? And what makes me thrive?

You know, I have a client where her whole family's larger. And her
breaking away, there's a fear of, will they not accept me. And she sees
them struggle with their health. And she's like, I don't want that. But it's
been we've had to create, who is Sarah as an individual? And what does
she want for herself, and knowing that she'll still be loved and accepted,
and also seen the members that are envious.

So there's a lot of dynamics. Weight is complex, and it's not just -- you
know, it always breaks my heart when people are like, “Why can't I
just lose this weight? What's wrong with me?” And I'm like, well, there's
nothing wrong with you and everything is right with you. But we also
have to look at the parts that want to reject you, or don't believe, or have
the coping and skill set, set up for you to really win at this.

**Dr. Mowll:** This is so important because, again, we can make a
recommendation for a particular way to eat, that's going to help blood
sugar, for example. But if we don't address everything that you've just
talked about here, it's not going to stick. And it's just going to become
another diet that maybe they'll succeed, maybe they won't, but it's not
going to have the impact that it could have.

And if we really want to improve our health, and that's what this
is about. It's not just about lowering blood sugar. This is about
transforming your health and your life. So if you really want to do that,
we have to go deep. And that's coaching. And that's shedding light,
shining light on these patterns, so that people can -- not necessarily just
get rid of everything, but make sure it's intentional. So that whatever
they're doing, it's going to serve who they are and who they want to be. I
love that, beautiful.

**Melissa:** Yeah. We had one client, and the biggest thing for him, he
thought he was going to die. You know, it's extremely about 324 pounds.
And he just was, you know, I just want to see my kids. And diabetes
was really tying into his “why” and seeing that he had already given up
mentally without realizing it. And he wrote his obituary from that belief
system.

And it was so awakening to him, that it changed everything. And his
why became really strong. And he saw that your “why” for why you do
this. If that's not strong, and you're not, you don't really want it, and you
don't actually see the impact of how it's hurting you. I hate to say that so
often, I feel like we have to be brought to our knees to really make some
of those changes.
And not everybody luckily, but you know, some and I’m such an advocate for saying like, don’t wait till it gets to that place. And dig into that “why” for you, you know. What would it mean? Like, would you really want to have that end tomorrow for you where you are, and allowing that to fuel you the fire to make the changes that are needed to live a really vibrant and beautiful life.

**Dr. Mowll:** You’re doing some amazing work.

**Melissa:** Thank you.

**Dr. Mowll:** Melissa Kathryn, thank you. Thanks for being here with me. People who want to find out more about you, where do they go?

**Melissa:** melissakathryn.com. So just my name, yeah.

**Dr. Mowll:** Thanks again for being here.

**Melissa:** Thank you.
Dr. Mowll: Okay. So, I’m here with Dr. Mark Menolascino, who is the author of the recent book called *The Heart Solution for Women*. And I think this is an incredibly important topic. I’m frankly surprised that no one has written the book yet. But it took you to do that.

So, I’m excited to talk about today, heart health in particular for women and how this relates to diabetes and blood sugar because there’s certainly a strong connection between diabetes, blood sugar, insulin resistance, and cardiovascular disease or cardiovascular health. So, why, first of all, do you think it’s important to focus on heart health for women in particular?

Dr. Menolascino: Well, Brian, it’s a pleasure to be with you today. And it’s always something that I enjoy talking to you about. Because you’re doing such a great job with the blood sugar story. No one’s really addressed this, women’s heart health. We’re just not doing a great job.

If three women and two men go to dinner and they all get chest pain. The men get admitted to the hospital. The women get sent home with heartburn medicine or anxiety medicine. It happens all the time. Women just show up differently. They’re evaluated differently. And they’re treated differently. And we need to look at them as unique and try to develop these personalized plans of how to prevent heart disease. And how to treat heart disease for women. It is reversible.

Dr. Mowll: Okay, well that’s good to know. So, women who are watching
this who have diabetes or maybe have prediabetes, insulin resistance, perhaps a little overweight, or obesity. What's the connection there to heart disease and vascular disease?

**Dr. Menolascino:** Well, we're taught in medical school that if someone has diabetes, they can have a silent heart attack. Because the way the nervous system responds with people with diabetes, it's not as razor sharp and tuned in like it should be. So, they can have different types of pain or different types of symptoms when it's actually their heart.

Well, that same thinking needs to be applied to women. Because women can have digestive problems, nausea, vomiting, dizziness. They can actually have things like anxiety and heartburn, and it be actually their heart. And so, a lot of times it gets missed. So, for people with diabetes and for women, it's going to show up different than that classic elephant on the chest feeling that men get. I have never heard a woman actually say that when she comes into the emergency room with a heart attack. It's always something else. And a lot of times it sends a doctor's down the wrong path. And they don't think it's her heart, when it is.

**Dr. Mowll:** Okay. So, I think you mentioned some of the symptoms. But could you kind of clarify now that we've made that big statement? What should women be looking for, you know, when it comes to potential heart problems?

**Dr. Menolascino:** Well again, it shows up different, the symptoms for women. It's not that elephant on the chest feeling that we typically hear. Classic heart symptoms are pain in the left side of the chest, radiating down the left arm, sometimes up in the neck, or into the back. But it starts with this heaviness and pressure. It's typically related to exertion or moving.

And so, when someone says, “Oh, I had a two second pain while sitting on the couch watching TV.” That's highly unlikely it's your chest. If you're out walking your dog and your pain started to increase. Or really for women, any symptom increases with exertion, that is one thing to be a red flag. If you think it may be your heart, get checked out. Because if you are wrong and it is your wrong, you could be dead wrong.

**Dr. Mowll:** So, let's talk about the getting checked out part. Because I think in functional and integrative medicine, you're going to do some things very different than maybe in conventional medicine. So, what is a good heart analysis sort of look like?

**Dr. Menolascino:** Well, it's a little complicated. But bear with me. In cholesterol testing there are four parts. The total cholesterol, the good one and the bad one. And what we do for women is we take their total cholesterol divide it by their good one. And come up with a ratio of their risk. I don't know about you, Brian, but I take care of people, not ratios. I don't like treating ratios. I want to personalize it one more step.

So, we take the bad cholesterol and break it up into its parts. It's got two non-sticky parts and two very sticky parts. And there is one called
lipoprotein a, that I encourage every woman to get checked. It’s resistant to the cholesterol drugs. They don’t affect it at all. And it’s a hereditary risk for some women as well. So, it’s the sneaky hidden inflammatory molecule that drives this process of building plaque and making the plaque unstable.

There are also some inflammatory markers. And you and I have talked about diabetes with this inflammation component. That's why these are also related. You've got to put the fire of diabetes out to put out the fire risk for the heart disease. But the inflammatory markers are three, C-reactive protein. And two new ones, myeloperoxidase and plaque two or PLAC II. So, lipoproteins, CRP, myeloperoxidase, PLAC II. Those are the four inflammatory markers that will tell you, are you at risk of an event now? We can actually identify those people who are at immediate risk.

Dr. Mowll: Are these a simple blood test? Can any doctor run them? Or where do people need to get those tests done?

Dr. Menolascino: Yeah. It used to be only the functional medicine doctors that knew about these tests. Now they have become widespread. You can get them in any city in the country. The problem, Brian, is we need more doctors to watch your program. Because a lot of doctors were not taught about these particles. They weren't taught that inflammation's the main component that drives heart disease.

And for women, there's a unique way we want to evaluate them. A treadmill stress test is not a great test if you're fit at all, to decide if you have heart disease. You want to add what's called an echo ultrasound or they do a stress echo. Where you run on the treadmill, at the very end they put an ultrasound probe, to look at the walls of the heart to see that they're moving. Not just look at the electrical pattern.

For women, they tend to have more valve heart problems. So, you get a look at the entire heart, the walls, the valves, and the blood flow. So, it's a great way for women to get sure whether she has a problem or not. And you just tell your doctor, “I remember, Brian and Dr. Mark talking about, I need something else besides the treadmill stress test. And it's called a stress echo.” And that's really, if you want to get evaluated, if you have a problem, that's the best way for women.

Dr. Mowll: It seems to me like there is some bias towards men in heart disease even in the medical profession, right? So, how do women get their doctor to do these tests? And to actually pay attention to their heart?

Dr. Menolascino: Well, there was a great Grey's Anatomy episode on last year. Where Bailey, the chief surgeon, was taking her husband to work. Didn't feel good, decides she was having a heart attack, went to a different ER. They kind of laughed at her. Put her in. Made her wait. The doctor finally saw her tests were kind of equivocal. Her EKG, heart tracing didn't show much. So, he started asking her about her lifestyle. “Oh, you have a child. Oh, your husband's a firefighter. Let’s talk about
your stress.” She said, “I’m having a heart attack. I know it. Fix it. I want a second opinion.” So, they brought a psychiatrist.

**Dr. Mowll:** Wow.

**Dr. Menolascino:** And then she ends up having a heart attack, going to the OR, and almost dying. Yes, that's TV. But I saw that in my residency. Women just come in, they present differently, and sometimes they’re not really taken at face value and determined. And it’s not just about your genetics. Just because your parents didn't have heart attacks. Doesn't mean you can’t. Just because they did, doesn’t mean you have to.

So, it’s really adopting all the lifestyle programs that you're working on. If you're working on that for diabetes, you're actually working on that for your heart too. So, it’s a real one plus one equals ten.

**Dr. Mowll:** Yeah. That's great. So, let's move and talk about some of those things. If we want to prevent heart problems because that's obviously the better side to be on, right? How do we do that? Like what are some of the best steps to make sure the heart stays healthy?

**Dr. Menolascino:** Well, you know, Dean Ornish, I worked with them when I was in high school. And he showed us that instead of having a cardiac bypass for blockage, you could do lifestyle medicine. They did a study in Minnesota looking at lifestyle medicine versus the top line diabetes medication. Lifestyle medicine beat it out. So, we know that proper exercise, looking at your nutrition, having some stress relief in your life, having some love and social support, is lifestyle medicine that beats a cardiac bypass.

Dean Ornish's group has still done better now 35 years later. So, we know that these programs work for reversal diabetes, for reversal of heart disease, and it’s really putting it all together. What’s your story? What's unique about you? How do we get lifestyle medicine to work for you? And that’s what I think you do in your program so well. You personalize it. Some people don't like to jog. Some people don't like to go to the gym. What do you like to do that we can help you? And help you develop this lifestyle plan, where food is your medicine. Kitchen is your pharmacy. Lifestyle is your doctor.

**Dr. Mowll:** That makes complete sense to me. Alright, Dr. Mark Menolascino, thank you so much for being here. The book is *The Heart Solution for Women*. And if people want to get that or find out more about you, what is the best place for them to go?

**Dr. Menolascino:** You can find the book on Amazon.com. And our website is MenoClinic.com.

**Dr. Mowll:** Great. Thank you so much for being here.

**Dr. Menolascino:** Thanks, Brian.
Extended Interview

Dr. Mariza Snyder

Dr. Mowll: Dr. Mariza Snyder, who is an expert in the area of essential oils and natural health. And, Mariza, I'm really excited to dive in today and talk to you about how we can use essential oils to help support our health metabolic function and to really optimize normal blood sugar levels. Which I think is something that everybody wants to know about.

First of all, I'm curious, how did you get into essential oils? How did you find essential oils? And start using them for yourself?

Dr. Snyder: Absolutely. I was kind of recovering from chronic burnout, chronic fatigue, and getting my hormones back on track. The one thing that hadn't gotten back online for me was that I was constantly chronically sick. I was getting colds, flus, strep throat and this was happening like in rotation every rotation. Like five to eleven times per year. So, a friend of mine was finally kind of fed up with how sick I was.

And she had an essential oil blend, it was an immune system blend, that was designed to not only help boost our immune cells. But also help fight viruses and bacteria. So, I started using it. I honestly, at the beginning, I had no idea what I was doing. I was putting it in tea. I was putting it in baths. I was diffusing it. I was smothering myself in it. I was just using it every kind of way possible.

And I remember starting to use it in October of that year. And I did not get sick that entire winter. And I did not get sick again for another three and a half years. So, that was a game changer for me. Because I
was drinking all the nasty tinctures. I was doing all the vitamin C. All the
Emergen-C. All the things that you’re told to do to get well and nothing
was working. And it was this oil blend that really changed the game for
me.

So, I was in practice. I wanted to know, “Well, how can these oils support
my patients?” Whether it’s digestive support. Whether it’s sleep issues.
Pain, headaches, or even if they’re dealing with metabolism issues.
Which a lot of us are, right? We always have something going on with
our metabolism. And so, that’s what I really began to dive into was how
these oils can be leveraged to help support, not only our health, but also
help create those habits that we want to create for ourselves.

Dr. Mowll: Wow, that’s fantastic. And if you wouldn’t mind sharing that
recipe blend before we finish up, it would be great. I think people are
going to be wondering why. But before we get to that, you mentioned
metabolic health. And this is something that I don’t think people
automatically think essential oils for metabolic health. You know, maybe
things like relaxation and obviously the wonderful aroma that they carry.
And maybe adaptogenic type of things for relaxation and so forth. But
these are powerful compounds that are in these essential oils. And they
can have a powerful effect on the body.

Dr. Snyder: Absolutely. They really should be considered plant
based medicine. Because they have, in some cases, the same type of
physiological benefits as we see in medicine. And to be very mindful, one
thing I always talk to people about, is how easy they are to use them. But
to just respect them as well. You know, I think we should always respect
plants in general. Because they are so powerful. I think plants were
really put on this earth to help heal us more than anything else.

I mean that salad that you had yesterday, that smoothie that you had
or the supplements that you were taking, most of those ingredients or
all of those things, are coming from plants. Essential oils are the same.
We’re just leveraging those secondary metabolites to elicit powerful
biochemical changes inside of the body. And it can definitely support our
metabolism, support our stress level, support our hormone levels, help
to support the way that the liver functions. I mean, across the board
where we’re getting to look at the research in more detail and seeing
that there’s a lot of benefits to using oils.

Dr. Mowll: So, for someone who’s new to essential oils. They come in
this little bottle, liquid drops. And people maybe are not sure how to
use them, especially again, for something like metabolic health. So, do
they put them on their skin? Do they smell them? Do they put them in
a diffuser to create an aroma in the room? Do they eat them or drink
them? What’s the best way to use essential oils?

Dr. Snyder: That’s a great question. The cool thing about the way to use
essential oils, whether it’s internal, it’s topical, or it’s aromatic, breathing
them in, is every single way is systemic. So, it doesn't matter which way
you use them. It's going into the bloodstream. It's going into the cells in your body.

And these chemical constituents have the ability to cross through the phospholipid cell layer. So, they can cross through the membrane and actually get into the cell. Now, when I think about metabolic usage, I often think about internal usage. However, internal usage isn't always necessary. And some people may not feel comfortable with internal usage.

So, if that's not the case, I would be recommending aromatic usage. Because by simply breathing those chemical constituents. They're going straight to the nose, into the lungs, through the alveoli, right into the bloodstream. So, we know that people can smell cinnamon oil and it helps stabilize blood sugar levels.

But we know that they have more powerful impact, if they were to actually take a little bit of cinnamon oil and actually put it in their tea, put it in a smoothie. They would actually have a more powerful systemic benefit than if they were just to breathe it in. So, it depends on what people's comfort level is between internal and aromatic. Note that aromatic is going to have a subtle impact. Whereas internal is going to have a bigger impact. So, that's just something to be mindful of.

**Dr. Mowll:** So, you mentioned cinnamon oil, which a lot of people are familiar with taking cinnamon capsules. But I always share that the research on dry cinnamon is that you really need to take a lot for it to have an impact. I mean, it's really a couple of teaspoons a day. And most people aren't going to do that. And if you're taking capsules, that's like ten or more capsules a day. So, the essential oils are different. Because they're much more concentrated, right?

**Dr. Snyder:** Extremely more concentrated. So, there's usually 70 times more potent than the herb counterpart and the dry herb counterpart. That's why we do have to be mindful of using like oregano oil. It is so supercharged in power, a very tiny, little bit goes a long way when it comes to dealing with something like candida, maybe it's dealing with fungus, or whatever it may be that people are treating. You need so little to get the job done.

The same instance with cinnamon oil. Like one drop of cinnamon oil is the equivalent to about two teaspoons, if not more, of cinnamon. So, you're getting a big power punch. And I'll tell you what a drop of cinnamon oil is really potent. So, you wouldn't put that in your tea. You would put that in a capsule. So, you would put that in an enteric capsule that you know is going to go down into the small intestine and get absorbed into the bloodstream.

**Dr. Mowll:** I have put drops of cinnamon oil in smoothies and blended them up. And it seems to be okay that way. It doesn't burn or anything. And with the right smoothie, it adds a really nice flavor. But you're right, it is very powerful. And I don't think we'd want to put that right on our
tongue because that could be harmful even.

**Dr. Snyder:** Absolutely. Well, it's a hot oil. So, it's in the category of hot oils. So, oregano, thyme, cinnamon, cassia, they are the criteria of hot oils. The interesting thing about internal usage is that people always concerned that oils that are warm like that, are going to disrupt the mucosal membranes. And the beautiful thing about our bodies is that we end up just creating a little bit more mucus to manage that. So, it doesn't actually. And the research that we're seeing, it doesn't actually harm necessarily. But I can imagine someone, if they're really concerned, to definitely put it inside of a capsule.

But if you were to put cinnamon on your arm, it will burn. It will be a hot experience. And in that instance, you want to use oil. You want to use coconut oil or jojoba oil, grape seed oil. Because water is just going to drive that oil deeper into the tissue. So, it's just a little safety tip. If someone accidentally puts oregano on their little girl, because they are trying to treat a wound or whatever, and it starts burn. You are going to want to put oil on that immediately because it dissipates the essential oil effectiveness.

**Dr. Mowll:** Okay. So, we talked about cinnamon oil. What other oils would be good for metabolic health? And we can talk about maybe helping people with sugar cravings or just trying to help them with their appetite? Or perhaps helping them to regulate normal blood sugars, that type of thing?

**Dr. Snyder:** Absolutely. So, one of my other favorite oils that I love for boosting metabolism, supporting metabolism, supporting gut health as well, and the immune system is going be ginger. So, ginger oil is great. Not only does it help support peristalsis, helps to activate digestive enzymes. It also is a warming oil in its own right. It's not as hot as the other oils that I mentioned just a moment ago.

But it does have a warming sensation. And it has been shown to boost metabolism and to support a sluggish digestive system. Which we know metabolism when it's slow, our digestive system slows down. And all kinds of stuff ensue after that, like constipation, we have inflammation in the colon, and maybe in the small intestine.

And so, I love ginger. If people are struggling with even digestive issues, ginger is a great oil. But we also know that it will boost metabolism. So, that's a favorite oil of mine that I love. And you put it in a smoothie as well. You can make a little immune system shot with ginger oil. There's a lot of different ways you can incorporate ginger oil into your daily life. And you think about so many different cultures. Especially Eastern cultures who use ginger for digestive support and metabolic support.

And then my other favorite oil for cravings, because you know we talked about this a lot. We always think about, “Why are we consuming so much sugar? Why are we finding ourselves snacking throughout the day? What is really going on?” And I like to call it an unmet need. It's very
rarely that your body, your liver, your gut, wants that Twinkie or wants the cupcake. If anything, they are screaming and running the other direction, right?

And so, I always want to think about those unmet needs, those cravings, whether it’s exhaustion, stress, emotions, or maybe it’s even unconscious boredom. That you don’t realize that when you are watching that Netflix show, you are not paying attention to what you are doing.

But if you find yourself in that state where you’re heading to the danger zone. Whether it’s the snack room inside of your office and someone brought cupcakes four hours ago. And you’ve ignored those for four hours until it’s four o’clock in the afternoon. Or you’re heading to your refrigerator just to see what’s in it because you’re needing something.

At that moment, that’s a craving kicking in, right? Either it’s your prefrontal cortex getting shut down. Your limbic brain is up. You’re in that survival kind of mode where we want to consume something even though our bodies don’t need it. I find this, especially the case for women, you know, if our bodies feel stressed or it feels exhausted, it thinks we’re going to die. Like, you know, we go into the survival mode. And your brain automatically kicks in this need to want something, salt or sweet. Oftentimes we’re not really needing that.

I mean, we think about our liver and how much glycogen we store there at any given time. We have a lot of supply. So, my go to oil for that, that moment where we are about to eat maybe one or two of those cupcakes, whatever it maybe, is peppermint.

So, in the Journal of Neurology, there was a really incredible study done by Dr. Alan Hirsch. And he looked at breathing in peppermint oil. And what we found is it will curb appetite. But most importantly it curves cravings. And that’s because when you breathe in peppermint oil, menthol, and all the chemical constituents in it, go straight to the limbic system. And shut that down.

But what’s also great is peppermint is also an energy booster. And it also oxygenates the lungs and brings oxygen to the brain. So, it has a multi-fold approach. So, whether it’s because you’re exhausted or your stress, peppermint is just a great kind of happy energy boosting oil. But it will literally shut down those cravings in an instant. And I have used peppermint on millions of women, men too. But mostly women for me. And it’s been the lifesaver. Yes, that’s my favorite.

And if you want to kind of up the ante, I also find grapefruit oil has been researched as a wonderful great anti craving oil. And that combination is the perfect energy, perfect booster, to kind of get yourself out of that danger zone.

And then my recommendation is once you breath that oil in. Just take one drop of each. Breathe it in. Is then walk away from the room. But that will do the trick. And that will buy you time. And it will buy you time.
for hours. Usually enough time to where you can get to that next meal without having a snack.

**Dr. Mowll:** Excellent. I'll add one of my own too, which is bergamot oil. And bergamot has been used in Italy for years and years. There is lots of studies on cardiovascular health benefits, blood sugar, and metabolic benefits. And I like to use that on the skin. You know, it has a really nice light smell. And it's a good sort of a base scent, I think for a lot of topical oils. So, I have a little oil blend that I put on. It has bergamot in it as a base. I think that it is really good for systemic, metabolic health too.

**Dr. Snyder:** It's amazing. And it's phenomenal for lowering serum cortisol levels, blood pressure, and pulse point. So, bergamot hits a lot of points. It's one of my personal favorite oils. I love that oil.

**Dr. Mowll:** Excellent. So, we promised you would share your immune blend. Would you mind sharing that before we wrap up?

**Dr. Snyder:** Absolutely. So, if you already had a 10 mil roller. So, we'll make this immunity blend super, super easy to use. It is going to be 10 drops of melaleuca, 5 drops of lemon, 5 drops of clove, and 5 drops of oregano. And top it off with fractionated coconut oil, jojoba oil, whatever oil you love. You can roll it over the bottom of your feet. You can roll it on your palms. And if you want to just turn that into a normal blend to diffuse, although I will say, it does not smell good. It is not a good smell. Oregano is not the best oil to diffuse. But if indeed you don't care, you're like, “I just want to get better.” I would just three times those drops.

So, you know, it would be 30 drops of melaleuca, 15 drops of the rest of them. Have a blend made up and you can just add it to your diffuser and have it running in the bedroom before going to bed or have it running in the house if you've got everyone who's sick in the house. So, that is my immune system blend.

**Dr. Mowll:** Dr. Mariza Snyder, thank you so much for spending some time with me. If people want to find out more about your work, maybe learn some new essential oils blends, and some of the things you're doing, what's the best place for them to go?

**Dr. Snyder:** So, my favorite place where people to come find me is my podcast. Essentially You Podcast. It's all about helping women and their families become the CEO of their health. You can find me on Instagram at DrMariza. And I share all kinds of blends in there. And then my website is DrMariza.com.

**Dr. Mowll:** DrMariza.com. Okay. Thank you so much.

**Dr. Snyder:** You're welcome.
**Extended Interview**

**Maria Emmerich**

**Dr. Mowll:** Okay. So, I’m here with Maria Emmerich, who is the author of some amazing cookbooks. The most recent is *Keto Instant Pot*.

**Maria:** It is a revolution. Everybody loves their Instant Pot.

**Dr. Mowll:** And we are going to talk about how to make keto practical, how to actually do this. And I also want to get into with you, the idea of focusing more on protein than maybe high fat. Because a lot of people are doing that in Keto.

**Maria:** It’s all about oxidative priority and how our body preferential different macronutrients. You know, proteins, carbs, and fats. And how if you really want to lose weight, ketone is great for so many things. And I start out with that. But if you want to lose weight, which 99% of the whole world wants to do, and that’s why they venture into this whole Keto lifestyle. If your body is already high fat, you don’t need to be adding a ton of it.

And it’s so interesting because I get kicked off of Facebook groups and stuff all the time because I’m trying to educate people on how to actually lose weight. And they’re like, “Oh, too much protein turns into sugar.” And I was like, “Chicken is not chocolate cake.” We need to like separate the two. It’s a demand driven process. And if you actually have type 1 or type 2 diabetes, your protein need is higher than what you think it is.

**Dr. Mowll:** Yeah. There’s some confusion because we do have to account for protein, especially if you’re type 1 diabetic using insulin, that
type of thing. But that doesn't mean that for that protein is going to get converted into sugar and drive your blood sugar up.

**Maria:** Well it's two different ballgames going on. And people get hung up with this like high ketone number. Higher ketones don't mean better results. So, don't get depressed if your ketones aren't like through the roof and you are very low. Like mine were just really low because I was running around the town in a fasted state. I was using my ketones for energy. And so, I'm going to have less in my bloodstream. I don't get hung up on checking my ketones anyway. I'm a minimalist in every way of my life.

But also, if you're checking with urine strips, just throw those away. They just tell you if you're hydrated. They will only work for the first two weeks. So, it is just interesting that people are always giving them out to help promote to ketosis or like these different products that will send those. And those are just garbage. Don't get depressed if your urine is a different color. It's just if you're hydrated or not. And you're probably dehydrated.

**Dr. Mowll:** So, let's dive a little deeper into that. Just that whole idea of you know, obviously, we want a very low carb. But then focusing on protein versus fat. What are some of the benefits of that?

**Maria:** Well, a lot of times women will start Keto. And they start it blindly. And then they messaged me all over on Instagram and Facebook, like, “I'm losing my hair.” My husband always says, “What are your macros?” Whenever someone asks me that on one of my groups. And they are always terrible.

You want to hit at least 0.8 times your lean mass, which is not 300 grams of protein. I'm not saying like a bodybuilder idea. This is a really decent, 0.8 times your lean mass, on average, it's like 80 grams for a female. You know, it's not a huge amount. But most women are doing bulletproof coffee, fat bombs, and egg fast. If you do an egg fast, you're never going to hit your protein goal. That's like 24 eggs, you know.

And so, that's where the whole carnivore idea comes into play. You don't need to add more fat to it. A chicken breast is a ketogenic diet. You don't have to have the chicken thighs and all of this that people think. Like, “You can't have chicken breast, it's not keto?” And I'm like, “Who said it's not keto, right?” If you keep your carbs low enough, you hit your protein goal, you will be in ketosis. Fat is to help keep you satiated. It helps with fertility.

You know, like again, if your goals are different, that's a whole another ballgame. You still want to hit your protein goal because nobody wants to lose their hair. Nobody wants a low thyroid, any of that. You need all of these amino acids for your thyroid function, your hair follicles, your nail follicles. If they are brittle and all of that, think about your protein goal.

And strong women rule, right? You're stronger than you think. So, you
want to hit that level. The fat is the gravy that goes on top. You don't have to add it. But it adds flavor. It adds texture. Vitamins A, D, E, and K. Those are fat soluble vitamins. Don't take your vitamin D without food, right? You know, those are all fat-soluble.

You need fat for hormone health and all of that. I'm not saying no fat. I'm just saying, you don't need to drink butter in your coffee. Never have I ever done that. I don't want to actually do any caffeine either. You don't need to add a bunch of sauce on anything. I love sauce. But it doesn't have to be added in order to be in ketosis. Like I love delicious tasty food. I just want people to realize you don't need to add butter to your steak. The steak is enough.

**Dr. Mowll:** I think that's an an a very important point. I mean, people carry around oil in their purse to add to their meals. Because they feel like they need to add fat.

**Maria:** You know what is in my purse? Where's my bag? Salt, Hawaiian salt. Yes. Because I'm a salt snob. And most of the time when you're at a hotel or conferences, you know it's all that Morton salt and all that junk. And I am a salt snob. I love flavorful salts.

**Dr. Mowll:** I love what you said. If you want to lose weight. If you want to lose fat in particular. You don't need to add fat. You already got enough fat to burn.

**Maria:** Part of that, that people say you need 70% of your diet to be fat in order to be in ketosis. If you have a lot of body fat, that's part of your 70%. It just depends on your goal. And that's why I look up protein sparing modified fast. That's a great way to lose weight. And I did a cookbook based on that. Because I don't want to eat just chicken breast. I want flavor. So, I did a bunch of recipes with that.

**Dr. Mowll:** Which book is that?

**Maria:** It's called *The Protein Sparing Modified Fast Cookbook*. It's an e-book or book. There are meal plans in there. And it's all dairy free. Nobody wants to hear that. But if you have autoimmune issues, we poo-poo gluten in this ketogenic world. But we don't address the dairy thing. And that includes butter. If you have autoimmune issues, there is some food triggering and autoimmune response. And dairy is a more common allergen.

You are asking about my children from Ethiopia. In Africa, dairy is a huge allergen. And they stay away from dairy. And so, that's where we'll do anything for our children. And that's where I kind of ventured into the whole dairy free world.

**Dr. Mowll:** So, you mentioned earlier that people can do fat to feel satiated. But protein is actually the most satiating of the macronutrients per calorie, right? So, a lot of people again, they feel like they need to add a lot of fats so that they feel full. But not necessarily true.

**Maria:** No, not necessarily. Like gram for gram, when it comes to
calories, protein is the most satiating food. And what's interesting, is like I mentioned that The Protein Sparing Modified Fast Cookbook. People are like, "I can't eat all that. I'm full." When you sit and put protein on your plate, wait to eat the fat. Because if you had the fat first, then you're never going to be able to finish that protein. Because you're just too full of calories.

But if you just focus on the protein, even that much, people are like, "Oh, I'm so full." And it's only like 800 calories of protein. But it's really powerful way of eating to lose weight fast. And that's what most people are looking for. And the reason why I'm like putting this out there is, I get so sad when people are like, “Oh, I tried keto and I gained like ten pounds.” And I'm like, “But you are reading all the bad information.”

Like I used to be the crazy lady out there. And now that keto is uber popular. It's a blessing and a curse. I love that, Jillian Michaels, is even talking about it. Even in a bad way, it's okay, right? Because it's just bringing more eyes. “Like what is this? I've never heard of keto.” I don't care. People can say whatever they want. If you do it properly, it is amazing.

This is all my kids know. And they used to be underweight. They weren't even on the growth charts when we first adopted them from Ethiopia. Within months, they were thriving, growing like mad. They're now on the 90th percentile. They're amazingly strong. And this is all that they know. They don't know any different. What's interesting is we were staying at a rental cabin, and this was years ago.

And they loved Legos and I said, “Boys, you got to pick up your Legos, it's time to go.” They started picking up their Legos and some were under the couch. And they are like, “This round Lego, something is wrong with it.” And it was an M&M. Somebody left it there from the past. And I was like, “I love you so much. You have no idea.” But this is what they know. I'm not depriving them. I still make ice cream. It's just keto ice cream. I still make snow cones or Hawaiians call it shaved ice. It's just different than what you are going to buy at the store. And they love it. They enjoy it. They love the food.

What was funny is I speak on those cruise ships. You know Jimmy Moore's Low Carb Cruise. And you have dinner together. And the first course is like a salad. And my little boy goes, “What do you think I'm a vegetarian.” Because he's basically a carnivore. They prefer that over vegetables. And I don't stress out about it because in my book, Keto, I have all the charts. My husband made all these charts about where the nutrients are. They're not in kale. They're not in broccoli. They're not in acai berry, or however you say it. It's in meat.

You want to take it a step further, it is in organ meat. Some people say, “Oh, I don't want to eat liver.” My mom saw some in my freezer and she was like, “Oh my gosh, can I have this?” I'm like, “Yeah, you weirdo.” Because nobody really likes it. She does. I don't. And so, my trick is, we
have a meat grinder. If you didn't know, I'm a bow hunter. And so, I do a lot of processing. And I tell my husband, “Don't tell me but grind up the liver and add it to some hamburger.” I'll make chili. I'll make meatloaves. Meatballs. Even hamburgers. You do like a four to one ratio, liver to meat. You don't even know it's in there.

So, anything brown meat. I even grind up my ribeye steaks. I know. People are like, “Oh my gosh.” But I love hamburgers. So, you just hide a little bit in there. It's like a multivitamin that you don't even realize. So, I don't stress out that my kids don't like vegetables. Because they're getting all of the nutrient dense foods. I think that there's just enough nutrients in vegetables to cover up all the antinutrients. And I know that's taking it a whole another step. But I just want people to realize if you're just eating meat, you're getting all the nutrients that you need.

**Dr. Mowll:** So, if people are kind of new to this or they want to dive into Keto, the way that you are talking about doing it. What cookbook or recipe book do you recommend they start with?

**Maria:** Well, if you really want to go carnivore do, *The Protein Sparing Modified Fast Cookbook*. But if you’re more like moderate. Because I have 12 cookbooks. And so, I always ask, do you like to cook, or you don't like to cook? Because if you don't like to cook, which you know, we're all busy working people. Halle Berry's favorite book that she cooks from is *Quick and Easy Ketogenic Cooking*.

If you don't like to cook and you can't have dairy, then *Easy Dairy-Free Ketogenic Recipes* is your book. If you do like to cook, Valerie Bertinelli, likes *Keto, Comfort Foods*. So, that was probably the most popular book out there. I think because we all want comforting, delicious food, like tomato soup and grilled cheese. We just have to make it a little different. That's probably my favorite recipe from there. But it just depends on what your wheelhouse is. You know, if you'd like to cook or not.

My personal favorite is, *Keto Restaurant Favorites*. Because I worked at restaurants since I was about 15 years old. Everything from fancy steakhouses to coffee shops. And so, I kind of put all of my favorites. I broke it down into Italian, Mexican, you know, like what kind of restaurant it is. And that one's my favorite. And it's probably just because I grew up with a lot of those foods. But I tried to make them quick and easy. Because we kind of need that. No matter if you like to cook or not. It's always nice to have food on the table within twenty minutes, right?

**Dr. Mowll:** For sure. So, it sounds like just get them all.

**Maria:** Oh yeah, you're right. Get them all.

**Dr. Mowll:** Maria Emmerich, thank you so much for sitting down with me today.

**Maria:** Thank you for having me.

**Dr. Mowll:** If people want to learn more about you, what is the best place for them?
**Maria:** You know what, I have a blog, MariaMindBodyHealth.com with over thousands of free recipes on there, if you don't want to get a book, I understand. There are giveaways on there. Otherwise, I'm on Facebook at KetoAdapted or Instagram at MariaEmmerich. Thanks for having me.

**Dr. Mowll:** Thanks again. You’re welcome. Thank you.
Dr. Mowll: Okay, so I'm here with Marcelle Pick, certified in functional medicine, nurse Practitioner who focuses in the area of OBGYN. And we're going to talk today about hormones, particularly related to the adrenals and how they are connected to blood sugar and Diabetes. 

So this is a big topic. I know a lot of people watching this deal with a lot of stress. And many of them are feeling fatigued and rundown from Diabetes and life in general. What is the connection between adrenal health and blood sugar?

Marcelle Pick: So we have a culture now of people that are so stressed out. I mean, especially the women that I see in my practice. They often times have jobs. They have children. They have aging parents. They're still on the internet on a regular basis with emails. And they're so spent, and they can't figure out why.

So they have blood work done. Their blood sugars are trending up. Their practitioner is saying to them, “You might want to change your diet.” But it's a much bigger issue than that. And the reason for that is if you have a lot of stress for a long time what happens is that cholesterol normally makes our sex hormones. And when it doesn’t do that anymore, it has to make cortisol because we can't live without cortisol.

We can live without our sex hormones. So our estrogen levels get low.
Progesterone levels get low. And DHEA, and also testosterone. Which causes people to say, “I don’t have a sex drive anymore.” And they feel horrible.

But they’re producing more and more cortisol because the stress is there. When that happens, it really pushes the adrenal glands. And the adrenal glands are very, very important for glucose control. And also for fluid retention.

So people are coming in complaining, “I can't figure out why my blood sugar is so unstable.” And then, when we address the adrenals and help normalize the adrenals, their hormones can come back into balance. I think what happens for a lot of people is their blood sugar starts to stabilize then. But we have to deal with what I call upstream issues, which is the adrenals first.

So we as a culture in medicine, the Endocrine Society came out and said there's no such thing as adrenal fatigue. Well the name is probably wrong. They're probably right in that regard.

I see people in my practice daily. When I look at their adrenals, they're horrible. Because they're so stressed out. And then all of the implications that you're talking about. With Diabetes, with blood sugars, feeling terrible, but the blood work is pretty much normal.

And as we address the adrenals, then all of those hormones come back into balance. The thyroid normalizes. Their digestive system normalizes. So it's all interconnected. And all what I call upstream effects of too much stress.

**Dr. Mowll:** Powerful message. Because a lot of people think Diabetes, blood sugar, and the first thing they go to is the diet. Cutting out carbs, or trying to get more exercise, or trying to lose weight. And those things, of course, are all important. But many times they miss some of these underlying factors. And I think the adrenals, and adrenal dysregulation or whatever we want to call it is a big one. Also it goes with thyroid, as you said. I think that those can be connected as well. So how do people dig a little deeper and find out if their adrenals are perhaps in some of the blood sugar problems they're seeing?

**Marcelle Pick:** Great question. I think most of us in our culture nowadays, the normal workweek is 80 hours. It used to be 40. And that has caused so much of a problem for people because we’re always on the go. We don’t have that break in our system to have quiet time.

The consequences of that then are people have lots of adrenal dysfunction. As a culture we might do a 24-hour blood test, and that doesn’t tell us a diurnal pattern of cortisol.
So you really either need to do a urine test, which gives you information five times during the day of what’s happening with cortisol. Or you do a saliva profile. That also gives you information as to what’s going on. Because I’m surprised, sometimes, some people have numbers that I thought, “Oh, my God, they’re going to be flatlined.” And they’re not. So my intervention’s going to be a little different.

And we know more than ever before that thyroid is also very affected by adrenals. So if you have a lot of cortisol, production actually increases reverse T-3, which is really the brakes on the thyroid. So if you’re only having a TSH done you’re not getting the information about what’s really going on with that thyroid. And that’s what we need to know because it’s all connected. Thyroid, the endocrine, the cardiovascular, all of it’s connected together. And thank God now we’re starting to talk about that relationship.

**Dr. Mowll:** Yeah. Really important. Cortisol seems like it affects everything. It’s an important hormone, right? When it’s out of balance, either too high or too low or not in an appropriate response. We can see blood sugar go up or fall too low sometimes. It gets unstable. So this is really a key area to look at. Sounds like a pretty simple test to do. Hopefully you can find a good functional medicine practitioner who can do that for you.

**Marcelle Pick:** Totally, yep. Because it’s going to make the difference of people being sick or not sick, so absolutely connected.

**Dr. Mowll:** Now, I’m sure a lot of the treatment is based on the testing. But what are some things that people can do generally?

**Marcelle Pick:** One of the first go-to’s is changing your diet. Making sure you’re having more protein. Getting rid of processed foods, especially sugar. Because those are the things, the carbs and the processed foods that really accentuate the blood sugar issues.

But also it’s finding ways to deal with your stress. And if you don’t understand where the stress is coming from, it’s going to be impossible to do something about it. Some of my patients say, “Well, I should exercise more.” If they have adrenal exhaustion, I don’t want their pulse rate over 90 because it’s too much exercise for a system that’s already pushed to its max.

So I will heal the adrenals first. And then I will have them start exercising, maybe walking and things like that. And then perhaps going to the gym. We need exercise, but not when you’re pushing your system too much. And also taking a really good quality multivitamin with methylfolate in it. So you’ve got the methylated folate in that particular vitamin, and fish oil, and Vitamin D.
Those are kind of the foundation that I start with my patients on. And then I'll use botanicals. Depending upon what I see or what I'm suspicious of, either I need to bring the cortisol down, or I need to bring it up.

**Dr. Mowll:** So really good practical information there. Some multivitamins, some supplements, and things that people can do to improve general adrenal health. You talked about exercise and how the wrong type of exercise could actually make things worse. What about more restorative exercises? Things like gentle yoga, tai chi, even things like meditation.

**Marcelle Pick:** Absolutely. Fantastic. Fantastic. Some people I recommend emotional freedom technique or EFT. The bottom line is we need to personalize it for people. What works for you may not work for somebody else. So it's finding out where in this arena do you feel more rested.

I'm a dancer. So I do barn dancing a lot. And that's my go-to because it helps me meditate and also gives me exercise. But somebody else might like yoga. Somebody else might like mediation. So you have to find out for yourself what speaks to your soul so that you do it on a regular basis. That's the key.

**Dr. Mowll:** Yeah. That's beautiful. I love that. So if somebody has adrenals that are dysregulated and perhaps this has been going on for a while, and they're feeling fatigued, and their blood sugar is unstable. They go on a protocol to start to heal the adrenals. What's the typical time frame that it's going to take to sort of recharge the adrenals? Can they come back? And if so, is it going to be a month, a year, or multiple years?

**Marcelle Pick:** A lot of it depends upon the person as to what they're doing to decrease the stressors. I talk a lot about something called the A Study, which was an adverse event study done in 1998. Looking at did you have adverse events in your childhood that contributed to a lot of stress. Because if you did, if those issues, even though it sounds like it was years ago and shouldn't make any difference. It does make a difference.

And if you have a high score on the questionnaire, your chances of heart disease are 145 percent higher, suicide, early death, and so on. So what I say to my patients is, “Look, we can heal the adrenals, that's not the issue.” But you have to look at where that stress is coming from. If you're a perfectionist, if you don't address why, you'll probably continue to do it, and we'll be in and out of this roller coaster of adrenal issues and blood sugar issues for a long time.
So it’s addressing the stress and understanding how to do it differently. And I know it was yesterday, it shouldn’t make any difference, but it does. Research is showing us it does.

**Dr. Mowll:** Wow. Very important and inspiring. There is a solution. So that’s fantastic. Marcelle Pick, thank you so much for being with me here today and being part of this. If people want to find out more about your books, because you have some great books, and the blogs, and articles that you write – what’s the best place for them to go?

**Marcelle Pick:** Go to marcellepick.com. That’s an easy place to go. Indeed.

**Dr. Mowll:** Thanks again for being here.

**Marcelle Pick:** You’re welcome.
Brian Mowll: So I'm here with registered dietitian Lily Nichols, who is an expert in gestational diabetes. And we're going to be talking about gestational diabetes today. Especially related to low-carb diets. Because I think this is something that a lot of women want to do, but they've got some concerns. Maybe their physicians have some concerns about them following a low carbohydrate diet while they're pregnant. Can you talk a little bit about that? And if there is some validity to the concerns, and maybe some strategies that they can follow?

Lily Nichols: So the concern over going low-carb in pregnancy actually originates from our dietary guidelines, which suggests there's this mandatory minimum amount of carbohydrates required for pregnancy, of 175 grams per day.

It turns out that's not actually the most evidence-based number. When you go and look at how that number was created and where they came up with it. The big concern that most clinicians will voice is that they think that if a woman goes low-carb she might go into ketosis. But ketosis from going low-carb is a low-level nutritional ketosis that pretty much all pregnant women are going in and out of ketosis throughout their pregnancy.

It's really not a concern. Where you start getting concerned about ketosis is if a woman is not eating enough food. So if she's starving herself, that
is not good. We don't want to be in ketosis because your body is burning your stored body fat for fuel because you're undereating. That's not good.

We also don't want to be in ketosis if somebody has preexisting Type I or Type II Diabetes and requires insulin and is not taking enough of their insulin. Then you can go into a really dangerous state called diabetic ketoacidosis. That's no good.

But for a pregnant woman who doesn't have those preexisting complications, they're not going to go into DKA. If they slip into ketosis and they're eating adequate amounts of food, it's going to be at very low levels. And they can monitor this actually with blood ketone levels to confirm that it's not too high. I've actually never had a client test too high for blood ketones when they are following a low carbohydrate diet.

**Brian Mowll:** That's great. And obviously it's important to do something because gestational diabetes leads to problems not only for the mom, then and later on. But also potentially for the baby. So could you speak to that a little bit?

**Lily Nichols:** Yeah. So with mothers, you can have a higher risk of other pregnancy complications that are related. Such as preëclampsia, or having to require a C-Section. Gaining an excess amount of weight during pregnancy. Just generally being more uncomfortable.

For baby, we see that there can be epigenetic effects. Meaning that like the way that their genes express and how that affects their future risk of disease. Can be negatively impacted by maternal high blood sugar in pregnancy. So we see higher risk of Type II Diabetes and obesity, specifically in children of women who had poorly controlled blood sugar in pregnancy.

So it is important to maintain blood sugar at normal levels. I think diet therapy should be the first-line approach. And really giving women the confidence to monitor their blood sugar. See which foods are making it high. Minimize eating the foods that are making it high but still eating adequate amounts food and calories in total is really the best approach.

And then, if needed you can go to adding additional medication or insulin as required to manage blood sugar. Not everyone can do it with diet alone. But we've got to do the diet part first.

**Brian Mowll:** It seems like a lot of women who are diagnosed with gestational diabetes go on insulin during their pregnancy. Do you think that is the most sensible approach? Is there a combination of – I guess, can diet alone do it in some cases? And is there – you're maybe doing it together in other cases makes sense? How do you look at that? The kind
of standard recommendations.

**Lily Nichols**: Yeah. If you embrace a lower glycemic, lower carbohydrate, eating to the meter kind of approach to gestational diabetes, you see the chances of a woman requiring insulin or medication drop by about 50 percent. So you can definitely reduce your odds. Notice that didn't drop to zero.

So there's always going to be some people who come into pregnancy with preexisting insulin resistance. Or for whatever reason, maybe their pancreas is not adapting as expected during pregnancy and is not producing the amount of insulin required to maintain normal blood sugar.

Those are the cases where insulin or medication is really a necessary tool. For me, it's always an adjunct on top of working on the food component because you can minimize the dosage required by controlling with food.

So if you think about the macronutrient that is most linked to high blood sugar is carbohydrates. If you eat a lot carbohydrates you might be requiring double or triple the amount of insulin then if you were eating lower carbohydrate, which would you rather choose?

They're both acceptable approaches, assuming your blood sugar stays well controlled, but the big challenge is as you eat really high carb and treat with high amounts of insulin. You also have a risk of overdosing at different times or sort of an unpredictable response to insulin where you might go hypoglycemic.

That carries its own risks. The nice thing about low-carb is it naturally kind of mitigates the highs and lows. So your roller coaster of blood sugar is a lot more gentle. And then the amount of medication or insulin needed to treat is a lot lower. And thus your risk of hypoglycemia is very, very slim.

**Brian Mowll**: So if a woman wants to use a low-carb diet during pregnancy, how does that look for them? Does that mean no carbs? Or very low-carb, and does that change throughout the pregnancy during different trimesters?

**Lily Nichols**: Great question. I think it does change throughout different trimesters. The first trimester and this is usually before anybody has been diagnosed with gestational diabetes. But say you know you have some form of preexisting diabetes or preexisting pre-diabetes. It will be important to pay attention to the quantity of carbohydrates and which foods you're combing with it.
But generally, people can tolerate more carbohydrates in the first trimester. You don’t yet have the natural insulin resistance that starts ramping up in late pregnancy hitting your system. You’re actually often more insulin sensitive during that time.

And this corresponds with the nausea and food aversion phase. And when women are generally craving to eat more carbohydrates. So I do like to give permission to have some more carbs during that time if that’s what your body wants.

But to do it in a way where you’re choosing the most nutrient-dense carbohydrates possible. So if you can minimize the white bread, minimize the cereal. And do more of like fruit, and sweet potatoes, and yogurt. Things that have micronutrients in there. And also combine it with a source of fat and protein. So you’re not getting a ridiculous blood sugar spike followed by crazy hypoglycemia.

I call it no naked carbs. That’s prudent. As you get further along in pregnancy and insulin resistance starts ramping, miraculously, usually the food aversions have subsided. You can now tolerate eating more vegetables and protein again.

You might be less inclined to eat more carbohydrates, and that corresponds with what works really well for your physiology at that phase too. I personally subscribe to a more moderate carbohydrate intake for pregnancy. I don’t think we need to go overboard restrictive unless there’s a metabolic need.

Like I said, eat to the meter thing for somebody who has any form of Diabetes. You should match your carbohydrate intake to what your body can tolerate as best as possible. If you reach a point where you can no longer reasonably and sustainably go low-carb, that’s when you look at insulin and medication.

But oftentimes, we’re able to mitigate the high blood sugar without going extreme Keto. I mean, we’re just talking moderately low carbs. Maybe 100 grams or so of carbs per day. More or less in a window of 30 grams in either direction. We are talking total carbs here, would be totally fine.

And that’s what I see working the best for still meeting your micronutrient needs — still meeting your protein needs. Going Keto where you’re also restricting protein, not a good idea in pregnancy. Going Keto where you’re also restricting your intake of plant foods to try to minimize your carbohydrate intake. You’ll get to a point where if you keep your carb limit so low, you have to start cutting out avocado, and berries, and leafy greens, and nuts and seeds.
And that doesn't make sense to me. Because as you do that—and I've run many different micronutrient analyses—you start minimizing your micronutrient intake. So I think we need to be smart when we're talking low-carb we're really prioritizing, limiting the starching high glycemic carbohydrates first and the sugars. And not having the obsession with minimizing carbohydrates carry into cutting out a bunch of nutrient-dense foods.

**Brian Mowll:** For the women who had gestational diabetes during their pregnancy, and that might have been five years ago, ten years ago, or something and they don't want to become diabetic. They don't want to become Type II diabetic. What are some things that they can do to sort of protect themselves?

**Lily Nichols:** Great question. So we do see a higher risk of developing Type II Diabetes later in life if you've ever had any sort of glucose intolerance, gestational diabetes type issue during pregnancy. And some of the stats are pretty high, 30 to 70 percent risk.

So it's considerable. It's actually the best predictor we have in women for predicting Type II Diabetes. Is having gestational diabetes in pregnancy. So a number of things.

First of all, not abusing the system. Meaning not eating super high carb, high glycemic diet that's going to continually spike your blood sugar and require your pancreas to pump out high amounts of insulin. This is pretty unsustainable.

And for the population as a whole, not just people with a history of gestational diabetes. This is something to consider. You also want to look at micronutrients that help with blood sugar regulation. Magnesium, chromium, Vitamin D. There's a lot of different nutrients that play a role in blood sugar regulation, which is part of the reason I'm so big on really emphasizing the nutrient-dense foods component of it so that you're meeting those micronutrient needs.

Staying active is also a big one. We know we can lower insulin resistance and improve glucose uptake in the body by being more active. So the more the movement you can build into your life.

And then I guess one that's specific to women would be if possible if you can breastfeed. The longer amount of time you breastfeed your child the lower your risk of Diabetes later in life. And they show that the benefits go back to nursing for three months. You see beneficial effects on either avoiding or delaying the onset of Type II Diabetes.

**Brian Mowll:** Well, thank you so much for being here with me. Lily Nichols, registered dietitian. If people want to find out more about what
you're doing, and you have some great books, what's the best place for them to look?

**Lily Nichols:** So you can find me at my main website, which is lilynicholsrdn.com., and you'll see a lot of different resources there. My blog, a lot of freebies. My handle's the same for most of my social media, @lilnicholsrdn. My books are *Real Food for Pregnancy* and *Real Food for Gestational Diabetes*. I'd recommend the former unless you've just been diagnosed with gestational diabetes because I do talk about strategies for screening for and preventing gestational diabetes in *Real Food for Pregnancy*.

**Brian Mowll:** Lily, thank you so much.

**Lily Nichols:** Thank you.
Dr. Mowll: All right, so I'm here with Dr. Kirk Parsley. And we're going to talk today about sleep. Now Diabetes, insulin resistance, and sleep go together very well. It's an important factor when it comes to maintaining good blood sugar. What is the connection, though? So how does negative sleep end up affecting our metabolism?

Dr. Kirk Parsley: Well, the research on that is overwhelming, right? So sleep – we are at this Paleo conference, and they have everything anyone's arguing for right now – there's 10,000 people arguing the opposite. Sleeps never been that way.

All of the sleep research is exactly the same for the past 50 years. It's not a very old science, right? It began by William Dement about 50 years ago. But it all shows the same thing.

And what it shows is that if you short sleep, which is defined as two hours less than you need — approximately six hours. Two hours less than you need is approximately six hours. You need approximately eight hours. If you short sleep you decrease insulin sensitivity by 30 percent. You decrease testosterone by 30 percent. You decrease growth hormone by 30 percent. You increase inflammation. You increase ghrelin. You decrease leptin.

So everything to set you up to one not have good insulin sensitivity, two
also craving a lot of bad foods. Because you're metabolically imbalanced. Three your prefrontal cortex is shot, right? Because that part of our brain is what makes us smart. Which makes us human. Which gives us our discipline, and willpower, and structure to our life. And be able to make an intelligent decision and act in a way that's appropriate for what we want.

And so once that's shut down, now you're much more likely to just grab a handful of M&M's here. Now you're eating worse, and you're metabolically worse, and now you're more of what we call catabolic, which means your breaking tissue down and stuff down. Taking big things and making them small things.

Anabolic is the opposite. So when you don't sleep enough you're more catabolic. So your body's actually breaking itself down, which is just generally poor for health and a million different reasons. That's the primary correlations.

Dr. Mowll: And I can just say clinically I have clients who are doing everything right. They're eating right. They're getting the right kind of physical activity. Their blood sugar should be coming down, but it just gets stuck. And when we look a little deeper, almost always they're not sleeping very well. It's a big factor.

Dr. Kirk Parsley: And it's the one really healthy thing that you're rewarded for not doing, right? So nobody brags about eating at KFC, right? It's a strange thing that we brag about how little sleep we've gotten. It's like a badge of honor. I was Seal, and I was a doctor, the two worst professions probably for sleep deprivation.

And sleep is for the weak. You don't need sleep, just push through it, suck it up, you know. Absolutely the wrong answer.

I always throw this out to people. All right, if I told you I'm going to make you run 50 miles six months from now, what would you do? Start running, right? If I said, hey, I'm going to starve for two weeks a month from now what would you do? You'd eat a lot. If I said I'm going to deprive you of sleep, about 85 percent of people say, "I'd start practicing not sleeping as much."

It's the one thing that we do that's critical for our health, that we don't actually have any awareness of. You know what you ate. You remember your exercise. You remember how you feel when you exercise. You know if you feel good or bad. You actually go to sleep you don't really know what happened, you just know that one minute you're awake and then another minute you're waking up. Everything in between is usually kind of absent, so you don't really know.
So without a conscious awareness of it, it's really hard to motivate people to do it. And the other thing that's been shown over and over again is that – they like to compare the impairment of sleep deprivation to various things. And alcohol is a good one. Because everybody knows how people behave when they drink a little.

So they do like driving tests and so forth. And a sleep-deprived person versus somebody who has a blood alcohol level of say .5, .8, or whatever kind of level they tested at. It turns out if you sleep six hours a night on average you perform as though you're drunk. You perform at the legal limit of alcohol. You're right at there.

So you're around .8 if you six hours on average. But the interesting think is when you get somebody to sleep really well for a while. And so now they are coming in with a strong base of sleep. And then you start depriving them of sleep, and then you test them the next day on anything, it doesn't matter. Strength, endurance, cognitive, learning, doesn't matter. Test them on anything, and they will do worse than the day before.

And they know it. They'll say, “I did worse. I was tired.” Do it again, they'll say the same thing. Do it again, they'll say the same thing. By day four everybody's like I'm totally adjusted, I feel fine.

So it's a lot like alcohol in that respect too, right? Because one beer you're like, one beer I can drive home. Then two beers, I better wait a while. Three beers, you're like, mmm? And four beers, your like, “Yeah, I'm fine.” That's you think. And hopefully, you have good friends around saying, no, you know.

But you lose that self-awareness. You're not conscious of the process that's healthy. It's like the most important think for your health is sleep. It's the only time you're getting better at anything. It's the only time your body's repairing. It's when all of you anabolic activities going on.

That's where you're learning everything that you thought you learned during the day. That's all getting consolidated at night. The most important part, we don't know if we did it or not well, because we're not really aware of it. And if you start taking it away from us we just adapt and we feel normal.

And it's like Diabetes or something, once you start correcting their metabolic dysregulation, they go oh, yeah, I don't remember feeling this good for – because it was such an insidious process. They now are caught on to the fact that they were getting worse and worse and worse. And sleep deprivations exactly the same way.

**Dr. Mowll:** What do you think are the main things that cause poor sleep?
**Dr. Kirk Parsley:** The primary reason for poor sleep is a lack of awareness of the importance of sleep. Or the lack of prioritization of sleep. I've worked with kind of everyone under the sun.

I've worked in really specialized groups, and I've worked with big organizations and everything you can imagine. The hardest intervention for me is getting people to sleep. Getting people to value sleep. It's the most difficult behavioral change.

Because it's a true behavioral change, right? And you can't just say, “Oh, I'm going to go to sleep now.” You have to set yourself up to be able to sleep so it takes – like you have to build your whole day around it.

Once I get people convinced that they to sleep, I convince them of the value of sleep and to prioritize it. It's really not that hard. They can go online and look up sleep hygiene so they don't need to pay me to tell them to black out their bedroom, and get rid of the lights. Like all of that stuff. Anybody can find that out.

And there's just like a few little tips and tricks when people are giving you their excuses. I have some little quips to kind of come back to kind of put things in reality. One of the most common ones is they'll stay up a little later watching television, right? And they'll say, I love that show, doc. They're being kind of playful.

**Dr. Mowll:** Some people fall asleep watching television, and they feel like they can't fall asleep.

**Dr. Kirk Parsley:** Right. Because it's their distraction, right? But the people who are like, “I really want to see that. I'm really watching it because I want to see it.” I say, all right, you can watch it, but I want you to go to bed on time. I just want you to wake up an hour earlier to watch it. And they won't do it.

So I tell them anything that you wouldn’t wake up early to do you shouldn't stay up late to do. It's exactly the same thing. This is a block of time that you're supposed to be sleeping, that's your dedicated block. It's like anything else.

If you have a dedicated block of time to do anything at work, you have to do it during that time because if you don't it's not going to get done. It's the same thing. Little nuances like that kind of help people correct their people, but it's really just the value.

**Dr. Mowll:** And we do tend to get more deep sleep in the early part.

**Dr. Kirk Parsley:** Yeah. So the way it breaks down is that the first half of the night is predominately is the deeper sleeps. And that doesn't
mean necessarily what we call slow-wave sleep that would show up on your aura ring or whatever sleep tracking device.

But your first sleep cycle is the most deep sleep, right? And you basically go from within probably 15/20 minutes you get down into what we call slow wave, which is delta and theta brain waves. That's when you're secreting growth hormone, testosterone. That's when the lymphatics of your brain open up and you flush out all of the toxins and halogens and all that type of stuff. And you kind of regenerate the CNS fluid to be cleaner.

Now your brain's actually ready to start repairing itself. Then forming new memories and all of the great stuff that happens where in the second half of the night you're decreasing all of your inflammation, repairing every tendon and muscle you've strained. That's all happening in the first kind of half of sleep.

And so what happens is you have a long deep sleep, and then a short rem. And a little shorter deep sleep, and a little longer rem. And then about halfway through the night it kind of flips over to being primarily rem. And your last sleep cycle is hardly any deep all rem. And that's a perfect what we call sleep architecture. That's idealized, which is probably only true in 25-year-olds and below. But the overall concept is valid.

**Dr. Mowll:** Yeah. I think it's important to get to bed early. To get to bed on time. Not only for quantity sleep but also for quality sleep.

**Dr. Kirk Parsley:** We have this circadian rhythm which most people have heard of. We actually also have another one the ultradian rhythms. And they're both pretty much aligned around sleep/wake. So the reason nightshift workers die 14 to 16 years younger than people who don't work nightshift, is most likely because their ultradian and circadian rhythms are never aligned.

So when those are both aligned every part of your body, every organ, every – every part of your brain and every part of your body are in unison. Are in agreement, we're sleeping now. And then during the day we're awake.

And so every function's different. Your liver functions different while your asleep than it does while you're awake, right? Everything is different. And so you have mismatch if you're doing something like nightshift and doing all of these tricks. You're putting bright lights in your eyes at the right time, you're darkening your glasses. So you're doing all of this hacking and sleep hygiene trickery, and you can move the dial on your cortisol. Which is kind of how we can tell where your circadian rhythm really is.
But you don't do anything for the ultradian rhythm. So it's really important as you say to get to bed at approximately the right time. Because we're timed, we're physiologically time to go to sleep three to three and half hours after the sun goes down. And it changes with the season, depending on how far you are from the equator.

And that's still true today. There are hunter gathers who have never seen electricity and they do exactly that. And how many people do you know that spend three and a half hours getting ready for bed? But you've got to get to bed early. That's for sure. It's way better to get to bed early and wake up a little earlier than it is to push yourself and go to bed later and get up at the same time.

**Dr. Mowll:** Okay. So a lot of people who can't sleep can't figure out how to sleep. And one of the things they'll do is take sleep medications to kind of knock them out. And obviously that's not ideal.

**Dr. Kirk Parsley:** In fact, your phrase, “Knock them out,” is the exact phrase. That's what it does. It makes you unconscious. If I hit you in the head with a baseball bat and you fell on the floor and people watched it they wouldn't think you were asleep.

They would say that guy's unconscious. If you take Ambien that's what you're doing. You're going unconscious. You're dissociating your neocortex, your big human brain from your lizard brain. Completely dissociating it.

We do sleep studies. And sometimes in really big environments. It's like a house environments, because you're doing research on something more complex than just sleep. And you give people sleep drugs, and they'll lay in bed for an hour or two, maybe doze off. They'll get up, they'll go play video games, they'll cook themselves some food. They'll eat. They'll play some more video games. They'll go back to bed like three hours before their alarm's going to go off.

The alarm goes off, they wake up. They'll tell you they've been in bed the whole time. Eight hours, nine hours. It's like, oh, I guess I slept pretty well. They just look at their watch, yep.

And then you show them a video of this was you. And they have no memory of it whatsoever. That's dissociation. That's all it does. That's all it does is dissociation. None of the normal chemistry that's going on in your brain happens.

So if you look at their study, what I was calling the sleep architecture, light sleep down to deep sleep back up, rem. That pattern that goes across the night. They're like all stage two. You get a little more deep sleep on certain drugs, and a little more rem on certain drugs. Whether
it’s Benadryl or benzodiazepines, the Z-drugs like Ambien and Lunesta. But they all suck. None of it’s really sleep. No.

Dr. Mowll: There are some natural things that can be maybe helpful for sleep. And I know this is part of what you do. And you recommend some. What are some of the best? Whether they be botanicals, vitamins, minerals, nutrients?

Dr. Kirk Parsley: Yeah so, the botanicals I don’t know a whole lot about. I’ve research them. It’s hard for me to read that kind of research. Just because it’s not sort of my traditional training, I’m not that great at screening it. I would trust somebody like Chris Kresser, or somebody to be able to read that better than I do.

There are definitely some things that are known to help. And my guess is that the primary reasons that most of herbs and so forth would work would be the autonomic nervous system, right? Because the more parasympathetic you are the more relaxed you are, the more likely you are to fall to fall asleep.

And so that’s my best guess. And there’s quite a few botanicals that are known to do that. Like lemongrass is one of them, and chamomile, and there’s some others. It’s not my expertise.

As far as foods, I just say stay away from high carbohydrate loads, because you get this big insulin response and crash. And that affects sleep architecture. You’re more likely to wake up. Your prefrontal cortex actually reads the rate of change of your blood glucose. The total blood glucose doesn’t matter. You could go from 250 down to 200 too quickly. And you’re brain perceives that as a stressor.

Your prefrontal cortex, let’s say you’re under threat. Your amygdala will ramp up, and you’ll start kicking your adrenal function up, and now you’re going to wake up. I like to stay away from simple carbohydrates, period. But definitely a lower glycemic load at night for dead sure.

And then activity-wise, I tell people a cool bath will help or a cool shower. Because one of your cues for to sleep is a decrease in body temperature, about one degree Fahrenheit. And that happens, of course naturally out in the environment. Once the sun goes down it gets a little cooler, and your body gets cooler. So it’s one of our natural cues.

And then supplemental wise, pretty much the stuff that I put in my supplement is what works. And so melatonin, everybody knows, is associated with sleep. Most people don’t really know how or why. So melatonin is actually a hormone. You can sell it as a supplement because the FDA just does whatever they want to do.
Vitamin D3 is a hormone. Melatonin is a hormone. You can sell those. DHEA is a hormone. You can sell those. Testosterone’s a drug and estrogen is drug. I don't know how it all works.

So what’s available if you go into a health food store and you don’t have a prescription from a doctor, the melatonin pathway is critical. What melatonin does is it decreases your brain sensitivity to stress hormones, and adrenalin, norepinephrine, epinephrine, which are both stress hormones as well. But cortisol as well.

So when you decrease your brain’s sensitivity to that, you kind of start slowing down the neuro-firing. You make it harder for the neuron to fire. And at the same time melatonin is being secreted, GABA’s increasing in the brain. And that slows down all of the neurons as well. It causes the resting potential of the nerves to drop lower and lower. So it’s harder to get that nerve to fire.

You’ll see a lot of people take melatonin supplements. The risk with that is that melatonin is a hormone, and if you give exogenous hormones, so from the outside in, just like if I gave you testosterone. Your testicles will quit producing testosterone. Your body’s a smart machine. If it’s getting it for free it's not going to make it.

You’re going to use that energy to do something else, right? So melatonin is a hormone, and the risk is if you take too much of a hormone, you shut down your body’s production of the hormone.

We haven't been able to substantiate that. I think it's because it's hard to test melatonin in the brain. But we are doing it through salivary essays. Maybe it works, maybe it doesn't. But one thing that has definitely been proven, and it's the same problem if I gave you testosterone. Not only would your testicles quit producing testosterone.

But if I'm giving you a ton of testosterone like a bodybuilder or something, your body will actually quit responding to testosterone. Your [inaudible 00:20:03] gets saturated, and they actually start atrophying, and you lose receptors for testosterone.

Same thing happens in your brain with melatonin. You take more melatonin than your brain would ever actually produce, and you start decreasing the number of receptors you have more melatonin. Now, if you take that melatonin away and your brains producing a normal amount of melatonin, you’re still deficient.

So what you want to do is make sure that you're never going, what we call super-physiologic above the normal range. So you have to take really, really, really small doses. Like two micrograms, four micrograms. Like really small doses.
Dr. Mowll: So all of these products with one to ten milligrams of melatonin is too much.

Dr. Kirk Parsley: I saw 50 in GNC one time. And I was like, wow. From the time the sun goes down until the time you wake up, your brain only produces about six to eight micrograms of melatonin.

So my product has four. But you only probably absorb about two of it in your brain at best. So we’re just kind of initiating it. And then anything that leads to that pathway could be helpful for you.

So people know about tryptophan coma, right? From turkey, from Thanksgiving. And there’s other reasons that’s going on. But tryptophan is an amino acid that, of course becomes hydroxytryptophan. With the help of magnesium and Vitamin D3, that five hydroxytryptophan are 5HTP becomes serotonin. Serotonin then becomes melatonin.

So you just bring all of the lumber to the construction site. You still have to have the construction crew. There’s nothing in there that’s magical that’s going to make you fall asleep. So you still have to be doing things right to some extent.

But those deficiencies are all really coming. Magnesium deficiency, Vitamin D3 is really common, and even 5HTP tends to be low in our stressed-out world. Because you strip out for serotonin, a lot of times. And the reason it’s associated with depression with think is because when your stress hormones are really high all of the time, your brain keeps trying to make more and more melatonin. And if you’re nutritionally deficient, then it takes all of your serotonin away. Now your serotonin deficient. That’s why SSRIs can help with depression we think.

There’s actually a whole new branch of science about ten years old, called chronobiology. And not just depression, but every psychiatric illness known to man is drastically, drastically affected by how much you sleep. So they’re actually curing with sleep hygiene and light therapy and so forth. They’re actually curing things like schizophrenia. I mean, it’s mind-boggling how important sleep is.

Dr. Mowll: Yeah. And there’s no doubt if you’re having a hard time losing weight, controlling your blood sugar, metabolic imbalances dysfunction. Look to sleep. Because it’s one of the most important things, and really can be fixed in most people pretty easily.

Dr. Kirk Parsley: Yeah. There are people who have sleep difficulties. Most of those people could get online and find the help they need. Or read a book or two. In my experience, and I’ve been doing this for 12/13 years. Maybe five percent of people who think they have real sleep problems actually need me. A lot more people than that pay me, but
that's all that really need me is probably about five percent.

Most people with the right motivation, get online do some study. Figure out what works with you. Tweak things around. Nothing works for everybody. Nothing works forever. They just keep monkeying around with it. If you value it you'll make it work. And then measure it, because if you don’t measure it you can't improve it.

**Dr. Mowll:** Dr. Kirk Parsley, thank you so much. If people want to find out about your work, maybe they are in that five percent, or they're struggling or want to get some extra help with sleep, or maybe look at the sleep formula that you have available – what's the best place for them to go?

**Dr. Kirk Parsley:** My last name is parsley, like the herb, docparsley.com. Not sure if my book’s on there. I have a book called *Sleep to Win* on Amazon. And then my website docparsley, blogs and links to my products, and links to other sites that I like and so forth. And soon to be a podcast on there in a few months, yeah.

**Dr. Mowll:** Excellent. Dr. Kirk Parsley, *Sleep to Win* on Amazon, and docparsley.com. Check it out.

**Dr. Kirk Parsley:** Yep. Thank you.

**Dr. Mowll:** Thanks for spending some time with me.
Dr. Mowll: So, I’m here with Dr. Ken Brown. Ken, great to be with you here today. Always love our conversations.

Dr. Brown: Absolutely. It’s an honor to be here. Thank you so much.

Dr. Mowll: Absolutely. So, we’re going to talk about the link between inflammation, blood sugar, diabetes. Because this is a big one.

Dr. Brown: It really is.

Dr. Mowll: So, we know that inflammation has been linked to many conditions. Cardiovascular stress, heart disease, stroke, dementia, and Alzheimer’s disease. How does it relate specifically to blood sugar and diabetes?

Dr. Brown: Well, so as a gastroenterologist, I’m a little bit biased. But I believe all health begins and ends in the gut. What we are seeing is that a lot of the inflammatory process actually does really begin in the gut. When we look at, let’s say, eating a bad diet that is filled with pesticides and things. You do lead to intestinal permeability or leaky gut. And if you’ve got bacteria growing where it shouldn’t, so that is CBO, bacterial overgrowth. That actually produces a molecule called zonulin, which creates intestinal permeability or leaky gut.
So, when I see my patients, and I get a lot of diabetic patients referred to me because they've got intestinal issues. And we'll notice that they're having more trouble controlling their blood sugars or the endocrinologist, their regular functional medicine doctor is. And then we realize, “Okay, well let’s take a look at your gut.

And let’s see what’s going on.” When I find out that they have significant bloating. Then we look and go, “Okay, it’s conceivable that you've caught yourself into a vicious cycle, where your gut is creating inflammation. Your body is responding to that as a pro-inflammatory cascade. Which ultimately leads to cortisol. And then that keeps rising your blood sugar.” So, now all of a sudden, we're chasing each other. So, as a gastroenterologist, I can usually help some people out control their blood sugar if we stop the intestinal inflammatory process.

Dr. Mowll: So, in a sense that inflammation is a stressor. It elicits this response from that adrenal axis. Cortisol goes up. And anybody who’s been managing diabetes for any amount of time with blood sugar knows that, high cortisol equals high blood sugar. Because cortisol is a glucocorticoid. Stimulates the release of sugar. And we get high blood sugar.

Take prednisone, for example, we know that blood sugar goes up. So, anything we can do to lower cortisol or to normalize cortisol levels is going to help. And reducing inflammation by creating a healthy gut is going to be one of those important things to do.

Dr. Brown: 100%. Something else that we are now learning is that brain gut access that people talk about, is also part of this. Because when you're talking about the HPA access or getting those adrenals started. There is evidence to show that we do create neuro-inflammation that can actually affect sleep. That actually creates the stress hormones to go up again. So, we've got gut that leads to inflammation, that leads to brain inflammation, that leads to stress, poor sleep. Now we are sort of chasing ourselves.

So, it’s almost like the glucose is a bit of a warning sign. When I see people that have gut issues, I ask them, “Hey, is your hemoglobin A1C going up? Is your blood sugar up a little bit higher? I think we got more going on than just a little bit of extra gas going on. So, if we can stop the inflammatory process in your gut, then we can help these other things downstream.”

Dr. Mowll: Almost like that check engine light comes on in the car.

Dr. Brown: That is a great way to think about it. Yeah, I love that.

Dr. Mowll: Letting you know, got to do something about. Especially if it’s
just mildly elevated blood sugar. So, you know, we’re not talking about blood sugar in 200, 300, 400 range. Although that’s obviously damaging too. But if you’re listening to this and your blood sugar is 110 or even 95, high 90s, that is the check engine light coming on. Something is going. Or something is driving the blood sugar up. And these inflammatory processes are one likely scenario.

Dr. Brown: Exactly.

Dr. Mowll: All right, so what can we do about it? How do we heal the gut? How do we get a healthy gut? How do we reduce that inflammatory process?

Dr. Brown: Well, it’s the three pillars of health. You got to protect your gut. And the best way to do that is diet first. Lifestyle, diet modification first. The usual stuff that I’m sure you tell all of your patients. And from my aspect, I also want to treat people to make sure that we can get rid of that bacteria.

So, that there’s no more inflammatory response going on. And I like to use my product, Atrantil, because it has polyphenols in it. Those polyphenols have now been shown to be an anti-inflammatory beneficial molecule that can actually help with blood sugar control as well.

And then I tell all my patients, as a gastroenterologist, you have to get great sleep hygiene. Let’s turn those devices off before you go to bed. Block that blue light. And then try to eat in a circadian rhythm so that you’re not disrupting that. Those are the three things that I mostly do with my patients. And surprisingly, these other issues, like you take care of with a diabetes and blood sugar control, can get better also.

Dr. Mowll: Yeah. So, you mentioned sleep, which is really important. But since you’re a gastroenterologist, I want to kind of come back to the gut here and talk about some things that we can do to create a better gut health environment. You talked about reducing those bad bacteria, helping with the dysbiosis, and sort of creating a more healthy microbiota in the gut. How do we do that?

Dr. Brown: So, the key is you don’t want bacteria growing where it shouldn’t. And so, that’s that bacterial overgrowth. Once that’s fixed, you have to feed the bacteria that you have your real microbiome which lives in your colon. You want a very diverse microbiome. The best way to do that is to eat the food that is going to support that. If you focus on eating very processed foods and the foods that have been extremely refined. Then you’re going to cultivate a narrow range of bacteria that are going to actually send signals and get you in that cycle of wanting more sugar.

And so, now there’s some evidence to show, do we control the bacteria?
Or do the bacteria control us? So, you may have people that have trouble and say, “It's really hard for me to get off these refined carbs.” Well it could be because you get signals from your bacteria. So, that's how come I like to do a circadian rhythm eating. Because if you eat too late, you actually change that process. And it's just like turning the lights on.

So, try and eat early. Try to make that 12-hour window. Let your gut use that period to regenerate, to heal, to do the housekeeper process, to clean things out. And then feed your bacteria what it really needs. You need to have those polyphenols that you're taking in. So, colorful fruits and vegetables. The proteins that you get, make sure that they're not very refined and processed. And so, it all just comes back to diet usually.

**Dr. Mowll:** Yeah, perfect. I love the polyphenol thing. There's an interesting study where they took blueberries and fed them to people with diabetes. Two groups, one got the sugar and fiber that was equivalent in the blueberries. The other got the blueberries. And the ones who got the blueberries had a much lower glycemic response. So, they thought it was the fiber, but actually turns out it was the polyphenols. So, polyphenols are powerful. They can really help with blood sugar control.

**Dr. Brown:** We'll be seeing a lot more research coming out with that. I'm going to give you a term that's not being thrown around a whole lot. But I've talked to some scientists that are now looking into this. You get our probiotics. We got our prebiotics. Now the term is going to be postbiotic.

So, we now realize that when you eat these certain types of polyphenols and a few other things. Your own bacteria, if you have a diverse bacteria, they will break it down into compounds, which can be beneficial. To get a little bit geeky here, one example is a polyphenol called ellagic acid, which you will find, I believe, in pomegranate. It is one that has a lot of ellagic acid. It actually gets broken down into a molecule that they can now isolate called a urolithin.

Urolithin causes mitophagy meaning it tells old cells to, “Hey, you are no longer functioning well. Why don't you just go away.” So, in other words, it's a way to get cells that are damaged to go away. And mother nature just does it better. There's a lot of pharmaceutical companies that are trying to figure out how to do this. But it is so complex, that you can still really do it through diet, all day long.

**Dr. Mowll:** I love that. Because we’re always renewing ourselves. And we are making ourselves new again. And I love the idea of you can be a lot healthier next year than you are this year. Especially if you’re battling diabetes and blood sugar problems. So, it's a great message. So, perfect.
Dr. Ken Brown, thank you so much for spending some time with me today. If people want to find out more about what you do, your website, or the product that you have available. What's the best place for them to do that?

**Dr. Brown:** Best place to do that is from my website, KBMDHealth.com. Go ahead and connect with me there. And then if you want to learn more about the product, it's Atrantil.com. And we'll give you all the information that you need. And hopefully get you hooked up and feeling healthier.

**Dr. Mowll:** Perfect. Thanks, Dr. Brown.

**Dr. Brown:** Absolutely, my pleasure. Thank you so much.
Dr. Mowll: Okay. I'm here with Dr. Josh Axe, author of *Keto Diet*. So, Dr. Axe, welcome. Glad to have you here with me.

Dr. Axe: Thanks for having me, Dr. Brian.

Dr. Mowll: Absolutely. So, I want to talk all about the keto diet. This is a hot topic right now. Especially for people with blood sugar problems. I think it's a really effective strategy for people to cut carbs and do it in such a way that there's some added benefits, not only for blood sugar. But for brain health and other things.

So, can you talk a little bit about the ketogenic diet? Maybe perhaps, versus just a low carb diet? What makes it different? And why is it beneficial?

Dr. Axe: Yeah, what makes the keto diet so different and also so effective, especially for diabetes and bouncing insulin levels, is the fact that your body gets into a state of ketosis. So, this is something that doesn't happen with any other diet except for with fasting. And so, actually the keto diet was discovered through children who are having epileptic seizures started fasting. And the physicians realize that the seizures went completely away.

And they said, “How can we create a diet that mimics fasting to where something happens with your insulin level where it becomes balanced?” And they found that when you get rid of the carbs, you increase the fat, that your body essentially gets into this fasting state or gets into ketosis.
Where your body, rather than breaking down carbohydrates for energy, it starts breaking down fat for energy.

So, it breaks down dietary fat. Your body breaks down its own body fat. Turns those into something called ketone bodies. And these ketone bodies or ketones, your body can use as fuel. Your brain loves it as fuel. Your body loves it as fuel. And so, you know, the keto diet is really effective. In fact, I think it is the most effective diet. Or one of the most effective diets when it comes to balancing insulin and reversing diabetes.

Dr. Mowll: Wow, that’s a powerful statement, reversing diabetes. And I know a lot of people watching this, that's exactly what they want to do. They want to reverse their diabetes. So, if somebody wants to use a ketogenic diet, again, just to differentiate it from low carb. What are the necessary steps? What do they need to do to get into nutritional ketosis?

Dr. Axe: Yeah. To get into ketosis, usually it takes about four to six days and your macro nutrients are typically around 70% fat, 25% protein, 5% carbohydrates. And so, it's a high fat, moderate protein, low carbohydrate. And you need to keep your carbohydrates to typically 30 grams or less a day. That way your body doesn't really have enough carbs to burn for energy. And your body has to start turning to fat and utilizing fat for your energy source. And so, that's the key.

The other thing I do want to say that I think is really incredibly important with anybody who's looking to reverse diabetes. There is a right way and a wrong way to do keto. When I'm on social media today, I see a lot of people calling things keto meals, where they're eating conventional bacon, conventional butter, and that's almost all they're eating. I had a patient come in one time and his name was Bill. And he said, “Dr. Axe, I just got on this thing called the keto diet. He was a new patient.” I said, “Bill, let me see what you are eating.” And it was like butter, bacon, and burgers every meal.

You want to get lots of vegetables. You want to get lots of healthy fats. And so, when somebody is following the keto diet the right way, their meal plan should look like loads of healthy fats, from things like coconut, avocados, olives and olive oil, wild caught fish like salmon, grass fed beef, nuts and seeds, even almond butter, pistachios, and macadamia nuts.

We want to be getting lots and lots of healthy fat in our diet. Even things like grass fed butter and ghee are fine. But you want lots of healthy fats. You want loads of vegetables. And you want a lot of collagen in your diet as well. That's going to support regeneration of healthy tissues in your skin, hair and nails, your bones, your gut lining, your arterial walls, all your joints.

So, that's really critical as well. But I think when somebody is doing the keto diet the right way, it's not all butter and bacon. It's a very nutrient dense diet. High in healthy healing fats like healthy saturated
fats, omega threes, lots and lots of vegetables, collagen, and other phytonutrients as well.

**Dr. Mowll:** That doesn’t sound too bad.

**Dr. Axe:** No. I actually think that a keto diet can be one of the most satisfying diets out there. I mean, I’ve noticed in working with patients over the years that when they follow a keto diet the right way they start to say, “Man, I can’t believe how full I am. I can’t believe my cravings are completely gone now.” That is one of the things that sabotages a lot of people.

But what helps people get rid of cravings is the combination of fat, fiber, protein, and certain Fido nutrients and antioxidants that help balance blood glucose levels. Like cinnamon, rosemary, and turmeric are really beneficial in that way. And also, getting more probiotics and sour foods actually also start to build up good bacteria, get rid of the yeast. It’s yeast and candida, when people have overgrowth in their body that causes them to have these ferocious hunger cravings that a lot of times caused them to crash and burn on any type of diet.

**Dr. Mowll:** Right, right. So, when they have those cravings, they start reaching for carbs, sugar laden foods, and so forth. So, what does a 30 gram of carbohydrate diet look like? Because a lot of people say there’s carbs in everything. How can I do 30 grams of carbs a day?

**Dr. Axe:** Yeah, I’ll give you an example. So, start off with breakfast. People could do either, my wife loves doing her espresso, okay? I do a lot of matcha green tea. But you could do some green tea or some coffee and maybe add in a little bit of MCT oil, grass fed butter, or something like that. But start off with that beverage.

An hour later do a keto collagen smoothie. Maybe it’s a one cup of coconut milk or almond milk, half an avocado. You could a handful of berries like blueberries or raspberries and then adding in something like a scoop of almond butter, a little bit of cinnamon. But it really can taste fantastic. For your protein, I recommend a multi-collagen protein or a bone broth protein. You could do a chocolate or vanilla flavor. Flavored with something like Stevia or monk fruit is fine.

For lunch, doing a big superfood salad. Romaine lettuce, spinach, mixed greens, cucumbers, tomatoes, olives, pouring olive oil on there, some vinegar or lemon juice. And then maybe salmon or chicken, something like that. And then an avocado on there as well is great.

For dinner, a grass fed burger, raw organic cheese over that. What I love doing is baked vegetables. So, asparagus, cauliflower, broccoli. Coating that in grass fed butter and coconut oil. Sprinkling on some sea salt. Baking it in the oven at 375 for about 40 minutes or so. And then maybe dessert, some almond butter with about 80% dark chocolate.

But that’s what it looks like. So, you can see it’s still satisfying. You have this great delicious smoothie/milkshake for breakfast, which is great.
You can have some dark chocolate almond butter. And in fact, in my book, I have lots of recipes for things like keto pancakes, keto brownies, keto fudge, keto cheesecake. I mean, you can still have these. You just need to know how to use the right sweeteners. Especially things like, again, Stevia and monk fruit, are typically the healthiest. That really have very little to no sugar.

**Dr. Mowll:** Yeah, it sounds very doable.

Now on the other side, we hear things like, the keto diet is dangerous. It's not good for women. It's going to suppress thyroid activity. And you shouldn't be on it. If you are going to do it at all, you shouldn't be on it for more than a few weeks. So, how can you perhaps allay some of those fears? Or maybe put some actual truth behind some of those myths?

**Dr. Axe:** You know, I think the thing people need to remember too, is the keto diet is a longer form of fasting. Just like you are going to fast maybe anywhere from three days, and not intermittent fasting, a true long term fast. You know you can fast anywhere from three to forty days. For most people that are going to do the keto diet, it's going to be about 30 to 90 days.

So, this isn't a forever diet. Think of it as a long term fast or a long time cleanse that can be done multiple times of year. But then people are going to move into more of a diet where they're going to add in a small amount of those healthy carbs. Maybe we go from 30 grams a day to 90 grams a day, triple that. You can add in things like a sprouted grain rice, some Quiana, some oats, maybe a sweet potato. More things like squash, extra fruit, you know, those sorts of healthy carbs they can add back in.

But that's the thing I'll say. I think a lot of people feel like, the keto diet is a lifetime diet. Now, Eskimos, the Hunzas, and certain civilizations lived in ketosis and on a keto diet. So, it can be done. And for certain people for a period of longer periods of time, like people with Alzheimer's or MS. I think they can more greatly benefit. But I will say, just to say that what, what I found in working with women who have thyroid conditions. That condition is due to high stress hormones. It's affecting their adrenals. And so, I've found if somebody is going to have really high stress hormones and they're not willing to change their lifestyle and take the right herbs and supplements to help bring the cortisol levels down, then maybe the keto diet is not right for them. But if people are really committed to making a change and seeing their health transformed.

And following a keto diet, adding in foods that nourish the thyroid, like berries and seaweed, are really going to help.

Or just even taking a capsule, like a spirulina or chlorella that has a little bit of iodine and some of those other greens in it. And then also taking adaptogenic herbs like ashwagandha, that can help lower cortisol levels. Taking supplements like CBD oil, which also helps lower those stress
hormones and cortisol levels.

But I found that's the secret. People with thyroid issues that don't do well on the keto diet, they don't do well on many diets. And also, it's a stress hormone issue. So, if we can bring the stress hormones down for those patients, building peace in their life, reducing stress, and using herbs and foods to also bring down cortisol levels. I think that's when they'll do very well.

The other people I don't recommend doing the keto diet are women that are in the middle of pregnancy. You never want to change anything when your pregnant. Now adding in some more healthy fats and cutting the sugar. Well, it will definitely do them good. There is plenty of women with gestational diabetes because insulin can start to get off.

Then a lot of times because they start over consuming the carbohydrates. And the other people I don't recommend doing a keto diet, are people with liver failure, severe liver, and gallbladder disease. But aside from that, I really think everybody for a period of time, just like people can benefit from fasting. People can benefit in a big way from doing the keto diet.

Dr. Mowll: You talked earlier about collagen and bone broth protein. Particularly a bone broth protein powder that you can use in a smoothie and so forth. What are some of the benefits of collagen and bone broth protein?

Dr. Axe: Yeah, so when we're talking about collagen, you know, collagen is what makes up a lot of our body. In fact, 30% of all the protein in our body is collagen based. Most people today, we are getting about zero collagen in their diet. And because of that, their body isn't regenerating and healing like it should be. So, collagen is what makes up our skin, our hair, nails, bones, discs, ligaments, tendons, connected tissue, facia.

Our gut lining is made up of collagen. Our arterial walls are made of collagen. So, we need to collagen to help regeneration of these tissues. Once somebody reaches the age of 25, their collagen production goes down every year. People with cellulite. That's actually, a lot of times, sometimes related to a collagen issue. They don't have the collagen for the structure, the regeneration, tone-ness, and the tightness of their own skin.

And so, collagen is really critical for tissue regeneration and healing of all areas. But if somebody especially doesn't have healthy skin, gut or digestive issues, or pain and inflammation in their joints, they want to make sure they're getting collagen in their diet. And it's probably the least likely protein to get broken down into carbs on a keto diet as well.

So, for that reason, I really think people want to be doing collagen as a supplement. And bone broth protein or just drinking real bone broth, you know, in terms of making it at home or something like that is great. But if you want an easy, convenient form, people can pick up a bone broth protein. It's high in collagen. But also high in glucosamine,
chondroitin, hyaluronic acid, and other nutrients that really support collagen production.

**Dr. Mowll:** Excellent. Dr. Josh Axe, thank you so much for being here. *The Keto Diet* is the new book. How can people find that? And more about you and what you are doing?

**Dr. Axe:** People can just go to their local bookstore, Barnes and Noble, or local bookstore. And ask for *The Keto Diet* by Dr. Axe. You’ll find it typically in every health section, every bookstore across the country. Or search on BarnesandNoble.com or Amazon.com. Just search keto diet, Dr. Axe, and they will find it there.

But Brian, I appreciate you having me. I love what you do. And love this masterclass. So again, thanks so much.

**Dr. Mowll:** All right, thank you. I appreciate you being here.
Extended Interview

Dr. Joseph Pizzorno

**Dr. Mowll:** I’m here with the great, Dr. Joseph Pizzorno.

**Dr. Pizzorno:** Thanks for that.

**Dr. Mowll:** I’m building you up. But you deserve it. You are a pioneer in the field in naturopathic medicine and natural medicine. And what I want to talk to you about today is this idea of environmental toxins, blood sugar problems, and metabolic problems because I know you’ve done a lot of research in this field of late. And I really think people need to know about this. So, could you talk maybe just a bit about the connection between toxins and diabetes?

**Dr. Pizzorno:** So, I think as we know, unfortunately we’re having an epidemic of diabetes. When I was in naturopathic medical school 50 years ago, diabetes affected like one half of 1% of the population. And now it’s 20 times more common. What happened? And people say, “Well, people eat more sugar.” But we’re actually not eating that much more certain now than we were 50 years ago. Sugar doesn’t explain it.

Then they’ll say, “Well, everybody knows obese people have way more diabetes.” And it is true, obese people have a lot more diabetes. Matter of fact, if you look at a person who is morbidly obese. They have a 50 times higher risk of getting diabetes. But if you look at the toxin load and you look at obese people in the bottom 10% of environmental toxins, they don’t have increased risk of diabetes. So, it’s not so much the fat.

And I want to be clear, I’m not saying being obese is good for you, okay?
But what I'm saying is, it's not as much the obesity as the problem. But it's what's in the fat, that's the problem. And it turns out that these environmental toxins in the fat are strong promoters of diabetes. A matter of fact, they are such strong promoters of diabetes, that the researchers call the diabetogens.

So, how do they cause diabetes? Their muscle mechanisms, probably the two that are the most important is toxins like arsenic for example. It actually poisons the pancreas. So, it cannot produce enough insulin, okay? And it turns out that 10% of the public water supplies in the United States, have arsenic levels that are high enough to be known to induce disease in humans. I'm not going to say it’s only from water with arsenic at it. But if you're all eating chicken with arsenic in it. I'll see it in rice that has arsenic in it. Now, you are starting to get a pretty significant arsenic load.

The other area is what’s called insulin receptor site binders. And so, here we have our cells. Cells have receptor sites. And when we test the receptor sites, it says, “Okay, let the sugar in.” Well, once these toxins actually bind to the insulin receptor site and they block it, so that in order for the insulin to be heard by the cells. The pancreas has to overproduce insulin to get the sugar into the cells.

Now it’s a good example of how wonderfully adaptive our bodies are to whatever challenges we have. Well, if you mistreat the pancreas for 20 or 30 years like that, making it overwork, it breaks down. Now you've got diabetes. So, what are the toxins that bind to the insulin receptor sites? And there are a number of them. And we break them into kind of two categories, persistent and non-persistent.

So, non-persistent means that you stop exposing yourself to them within a few days, your body can get rid of them. But the problem is, many of those not persistent toxins, we’re exposed to constantly. The persistent toxins are the ones that once you are exposed to them, they are very hard to get rid of. So, let me start there. The nearest I can tell from looking at a lot of research. The worst of the persistent organic pollutants called POPs for short, are PCBs. PCBs are very good at binding to the cells and blocking these receptor sites. And my best estimate right now is about one out of four cases of diabetes is due to PCBs.

Dr. Mowll: Wow.

Dr. Pizzorno: Now here's the problem. The half-life which is how long it take to get half of the toxins out of the body? Half-life of PCBs in humans, ranges from three to twenty-five years. So, once it's in your body, it's almost impossible to get rid of. Now you can. But you got to work really hard at it.

And it turns out, and what I tell people, the most important thing to do is, don't let PCBs in your body. And the primary source of PCBs appears to be farmed fish. Because the feed that has been given to the fish is contaminated with PCBs and other chemicals. And it goes into the fish.
And it goes into us. So, that's one problem.

Now, the other area is the non-persistence. And there's two that are the worst there. One is the phthalates. Phthalates are chemicals that are put into health and beauty aids to solubilize and stabilize the fragrances. And also, the phthalates are used as softeners for plastic. So, for example, if you're taking a hot shower and the hot shower hits the plastic curtain, and you smell the plastic. Those are phthalates going into your body.

Also, bisphenol a. The other one is bisphenol a. Everybody knows it is in a lot of plastics. And bisphenol also blocks the insulin receptor sites. Now a lot of products are being manufactured now and promoted as bisphenol a free. Well, that's a good idea. But if they are substituting bisphenol s, bisphenol f, bisphenol z, it turns out they are just as bad as bisphenol a. They just don't have as much human research yet. So, they have been allowed. But it is still a problem.

So, my approach for people with diabetes is first off, you have to do the foundations of health. Eat real food, organic grown if at all possible. Get exercise. You know, have loving relationships, have a positive attitude in life. Those are foundational things. And then, you've got to stop the toxins coming into your body. And if they are in your body and you've got the diabetes, you've got to get those toxins out.

So, a book I wrote called, *The Toxin Solution*, describes to people how to do that. And what I say to people, “Don't do a detox program until your body's ready. Because we're so loaded with toxins. Our normal systems of elimination are not working very well.” So, before putting a person on a detox program, I say, “First off, let's work on cleaning up your gut.” Age old naturopath concept, disease begins in the gut. So, let's clean up the gut. Then our poor liver has been overloaded with all these chemicals. Let's get the liver functioning better. And something that I'm doing now that I didn't have to use when I first started developing this way of doing it almost 50 years ago. You've got to now work on the kidneys. Because so many of the chemicals we're exposed to and some of the drugs that people have been prescribed, they are wrecking people's kidneys.

So, it is clean up the gut, clean up the liver, clean up the kidneys, and now let's do a detox program. Because now your body is ready for it. And in reality, it works. I've seen people with diabetes reversed by detoxification.

**Dr. Mowll:** Fascinating information. And this is an area that people are really going to want to explore and learn more about. So, I highly recommend picking up the book. And Dr. Pizzorno, if people want to find out more about you or where to get that book? And other information, where can they go for that?

**Dr. Pizzorno:** Well, the good news is that, *The Toxin Solution*, is available on Amazon. It's an inexpensive book. It's easy to get. And I have a
website, DrPizzorno.com. I'm not very good at keeping it up to date. I got to put more attention on it.

Dr. Mowll: Go to Amazon. Get the book, *The Toxin Solution*.

Dr. Pizzorno: Read it and follow it.

Dr. Mowll: And that's going to teach, not only about the detoxification process. But also, about how to prepare the body for detoxification.

Dr. Pizzorno: How to prepare the whole body and then how to live in a low toxin life. My wife and I have been working really hard looking at all these various aspects of what you do to decrease your toxic exposure? And unfortunately, in today’s world, you've got to work at it.

Dr. Mowll: Doc, thank you so much for being here and taking the time today.

Dr. Pizzorno: Thanks for the invitation.
Dr. Mowll: So I'm here with Joe Cohen, who is the creator of one of my absolute favorite websites, which is selfhacked.com. And we’re going to talk today about really decoding your genetic code or at least understanding your genetic code more, and learning how to, perhaps, use that to improve outcomes or improve your health. You have SelfDecode, which is all about that and a service that actually helps people to do that to understand what's in their genes. So, first of all, it's an honor to have you.

Joe: Thank you for having me.

Dr. Mowll: Absolutely. And I’d love to talk a little bit about the value of even doing genetic testing. Maybe for ancestry, it's interesting to find out about perhaps a breast cancer risk or something like that, they can see some value of their family history.

But when they think about overall health, and particularly diabetes and blood sugar and so forth, I'm not sure that people understand the value of doing it. Some people say they don’t want to know, we hear that sometimes. But I think what's important to understand is that the way we look at genes today is much different than even 10 years ago, let alone decades earlier. So could you maybe talk about how things have changed and why we would even want to look at our genetic code?
Joe: Yeah, so there are a lot of misconceptions running around genetics. And when I see people afraid of getting their gene sequenced, it especially means that there are misconceptions around that, right. Because for example, two of the most common genes that people are afraid of are ApoE and BRCA1, as examples.

And that’s not necessarily related to diabetes. But ApoE may be a little bit. Yeah. But most like Alzheimer’s or breast cancer, and people think like, “If I have these genes, there’s nothing I can do about it. I’m just going to be dying, and I’m going to get anxiety about it. Am I gonna die in 10 years?” That’s a huge misconception. So we have an ApoE report, the whole report tells you exactly what to do about it.

There are actually hundreds of studies about how you can counteract the genetic weakness with ApoE. Now, some of them are in animals, but you also have a lot of human studies, as well. And so that’s one example. We don’t have a report on BRCA1, but even just reading about it a little, and I’m not an expert on it, but I’ve read a lot. What I found is that people who have BRCA1 are much more likely to be sensitive to get breast cancer from plastics and other certain kinds of chemicals.

And so instead of being afraid, you can turn that into empowerment and say what do we know about BRCA1. Now, we have an ApoE report, maybe we’ll come out with one for BRCA1. But the point is, whether we have a report on it or not, there’s information out there that you can reduce your risk if you have this gene.

Now, that applies to probably like half the gene out there. There’s something to do about them. And you know, most of the genes have small impacts, we’re talking about 1-2%. And the reason you come down with something is because you have 50 genes that are contributing to that variable. And so genetics can seem like this massive kind of jungle, because you have 20,000 genes, how are you supposed to narrow down what you’re interested in? And the approach that we’ve taken is an approach that I think needs to be taken for -- This is how people need to think about it.

So first of all, your genes don’t determine what happens in your life necessarily. We’re not at a point where we can diagnose and say, if you have X and Y gene, you’re going to be diagnosed with these diseases. You could have BRCA1, ApoE, MTHFR, whatever you want, and you’re not going to have any kind of issue from these genes. And the reason is because they always interact with a whole bunch of other variables then interacts with other genes. They interact with lifestyle variables, diet, everything, you know, nutrition. There are just so many things they interact with.

So you can’t diagnose a person based on their genes. But what you can
do is, if someone is already diagnosed with something, or if someone feels they have a problem in an area, maybe they want to be happier, maybe they want to sleep better-- is not necessarily a diagnosis, but it's an area where they want to improve, then obviously, there is some kind of genetic weakness that is causing those issues. Because you could live in the exact same environment, do the exact same thing with someone else. I've seen, like somebody can be massively obese. And I get tons of clients who say, “No matter what I do, I can’t gain weight.” So we see what is that difference, right?

They could both be eating relatively unhealthy and one person can lose weight, one person can gain weight. It's obviously the influence of genetics. And it's usually the person who's thin has a parent who's very thin, and the person who's overweight has a parent who's overweight. So there's an interaction with the environment, because, you know, 10,000 years ago, they probably weren't obese.

Like, their ancestors probably weren't obese, but there's also an interaction with the genetics because their parent is obese. And not everyone is obese in society. You know, even if you just take the group of people who care about that, it's still massive variation. So with diabetes, for example, I'm sure you know that there are a lot of people who tried very hard to lower their blood sugar, and it's very hard for them.

Dr. Mowll: I think it's mine. I'm sorry, I didn't hear you. Well, let me just turn this off.

Joe: I was afraid it was mine.

Dr. Mowll: Yeah, I know. So you said with diabetes.

Joe: So taking diabetes as an example, as you know, there are some people who could be trying everything and anything, and they still seem to have problems with the blood sugar. It's like, why am I doing this? And then there are people who eat junk all day. And they still don't have a blood sugar problem.

Now, those are two ends of the extreme. Usually, it's a combination, you know, they might be doing some things and they're still having problems. So that is genetic. And so, if you already have a genetic problem, if you already see you're predisposed to having diabetes, then you focus in on just diabetes.

And so now you narrow down the field to 20,000 genes to 100 genes that are very important. And out of those 100 genes, maybe 50 of them you can influence. And so you know, you're already dealing with a starting point of 50 genes, it's not that overwhelming at that point. And
out of those 50 genes, you might be only weak in 10 or 15 of them.

Now you've narrowed down from 20,000, to 10, to 15 genes that you most care about, and you can do something about that will make you healthier and more targeted. And so I got into this because I solve my own problems with genetics, it taught me things that I didn't know.

Now, I didn't only do it with genetics, but it gave me insights that I would have never gotten otherwise, because it told me the genes that I need to focus on. And that told me the mechanism by which I was having problems. And that allowed me to have a protocol, to integrate protocol that would target those mechanisms along with just helping whatever my issue was in general.

So I had a whole list of issues, 20 issues; fatigue, brain fog, insomnia, gut problems, inflammation, joint pain, you name it, I had it, and mood problems. It was just everything, and I solve all of them. And the way I was able to do that was with this gene based biohack, which is -- what I think the future is, a biohacking in general. Because, you know, do you want to go into something blind? Or do you want tips, clues.

The way you can think of genes now is this clues. They're not going to tell you the answer 100%. But it's like, “Hey, here's a clue to figure out the puzzle.” Your body is a puzzle. It's a very complex machine and you have these. You know, you have 15 clues now if you do the research. So what we do is we break it down by topic, and so we narrow that list down for you so that you don't have to be a scientist that spends a year trying to figure it out yourself. We break down for you, we have the software and so you're left with the 15 genes that are most important for that specific issue.

And the other misconception is, when people are giving recommendations, we're one of the only companies that can recommendations. The few other companies that do give recommendations -- like 23andMe does not give recommendations. I guess in the beginning, they got in trouble for trying to diagnose a disease.

And I think that's flawed, not even from a regulatory perspective, but even from a science perspective. You can't tell someone with the likelihood that they're going to get a disease, because if they're eating very healthy, or they have other factors, it completely changed through this. But in any case, you have a lot of other companies trying to give recommendations based just on the genes.

And that is a flawed approach now as well, because maybe in 25 years, we can do that with AI and a whole bunch of other complex software. There's no way we're going to do it by just printing out some report and
seeing what the less common alleles are for various genes. That’s not how it’s going to happen. But in any case, the way we do it now is we only give a recommendation for something if it’s also going to help that area.

So let’s say we had a diabetes report. We’re not going to give a recommendation on… We wouldn’t do it on diabetes because we’re not going to try to cure disease or anything, but we could do it on blood sugar, blood sugar balance or something like that. We would only give recommendation that also help blood sugar, and it also targeted that gene.

And so an example of a gene that’s very important in diabetes and blood sugar control is TCF7L2. This kind of gene is actually quite important because it controls other genes. But one of the most important aspects of this gene is that it lowers GLP-1; Glucagon-like peptide-1, which we know is important in diabetes and there are drugs that increase this. DPP4 inhibitors are an example. Exenatide. So you have drugs target this. And if you have a gene that causes your GLP-1 to be lower, that will cause problems with blood sugar control.

Now, on SelfHacked, which is my other website, we have a list of 20 ways to increase GLP-1. So if you have this variation in that gene, the TCF gene, then you want to make sure that you’re doing at least one or two things or a couple of things that are going to help your blood sugar in general. Most of the things that are increasing GLP-1 are going to be good for blood sugar.

And one of the most common ones could be fiber. Maybe increase your fiber. You might be getting some fiber, but you know what, here’s the biohack. Try to increase your fiber if you have this gene. Another one is Berberine; Berberine is a drug that can increase GLP-1. It’s not a drug. It’s actually a natural supplement that’s sold over the counter in the US.

Okay. Berberine we know is good for diabetes anyway. We know it’s good for blood sugar control, you might recommend it anyway, people might take it anyway. But having another piece to the puzzle saying that, “Okay, this has another reason to help me that I didn’t realize before.” And that’s how genetics should be viewed these days. That is the only scientifically valid way that you can use genetics for your benefit. That’s not like some kind of quackery or something like that.

**Dr. Mowll:** It makes a lot of sense. So what is the starting point? I mean, people would get a test, like a 23andMe or there are other ones out there. And then they would send the information to you through SelfDecode, and your software then gives them the report and the information, is that the way it works?
Joe: Yeah. You can either use a different service. 23andMe and Ancestry are just as good, actually. So if you have your Ancestry, 23andMe or other services, we take other services. And we've been starting to take whole genome data. But if you don't have any kind of information, and you're afraid of doing genetic testing, I hear this a lot.

We hear that, oh, I don't want to do genetic testing because 23andMe is in the pocket of Glaxo and Big Pharma. We understand so what we did is we just have a chip of our own that we don't make money from, is just a service, we don't sell your data. And so you can buy it from us, or you can buy it from any other company, we don't care. Our focus is on the analysis, but we do give that just as a cost basis, we offer that and it's under $100.

I think in 2019, and going forward, is critical that people have some kind of genetic sequencing. And if they're concerned about diabetes, you want to look at some of the genes that are very impactful, like the TCF gene. And so we have like around 10 reports. One of them is a fitness report that might have some relationship to blood sugar control.

We don't have a blood sugar control right now, but we have one on mood, sleep, inflammation, cognitive function, and a bunch of other topics that are interesting like ApoE. The topics that we discussed, you know, we can't do everything, we got to hit one at a time, because then it could be just too overwhelming trying to tackle everything at once. But yeah, essentially, you really want to focus on the genes for diabetes. And just even getting a test and just finding out your TCF status, is worth it alone. It's like how much is the blood test cost? 100 bucks, right?

You're getting a piece of information just from that gene that's more important than other blood tests. You can take a blood test for your blood sugar, first of all, you're going to have to prick yourself. This is just a saliva test. And it's going to give you more information than any blood test is going to give you just from that one gene. It's also great to have your blood tested; it serves a different function to see how you're doing in real time. That's the actuality of, “Hey, I'm actually doing better. My blood sugar is going down, my HbA1c is going down. So I think that's very important.

And then over time, the dividends don't stop because there's new information. We might come out with a blood sugar report. If we have demand and people are asking, we can create it, you know. There's always new information coming out. I think it's a no brainer. You pay once and you get the dividends over lifetime. But even just that one gene will be worth it.

Dr. Mowll: Can we talk for a few minutes about ApoE because I think there is a strong connection -- obviously, is a connection with diabetes
and blood sugar and insulin resistance and Alzheimer’s disease. And a lot of people are cautioned against saturated fat, for example, in general with diabetes. And I think understanding the ApoE status maybe could help give a little direction on diet, as well.

Joe: Yeah, definitely. So that’s why it’s so important to know that because it does have an impact on what kind of diet you’ll want to do. Our report is like 20-30 pages long about if you have this variation in there; you can have different variations within that gene. And that will really give you some good information.

So, the important thing is you don’t want to get freaked out. You don’t want to take any drastic medical action. And that’s where the FDA kind of gets concerned as well. Because, you know, when Angelina Jolie cut off her breasts because of her BRCA1 results, that’s a serious medical intervention from having a gene that I think is unwarranted, and the FDA also did. It’s like, well, hey, these people are taking drastic medical action.

So the number one thing is you don’t want to get freaked out, you want to focus in on what you can do to make it better. That’s not a drastic medical action, like tweaking your diet. So one of the things that’s very important for the ApoE genotype; the E4 genotype, is that you have to make sure you’re getting enough DHA. So DHA is critical for people with this ApoE4 genotype.

Now, you might be someone who says, “Oh, I eat fish once a week and that’s fine. I’m following recommendations, maybe twice a week.” You need more fish than that. Then it could be something like, either you would eat fish more often or you take fish oil. So that’s just one example of something within the ApoE4 genotype, if you have that genotype, what you would do to make sure that you’re not getting those negative impacts.

But it’s really a long list of things that you can do. Yeah, but that’s one of the most significant ones, the DHA.

Dr. Mowll: I think this information is really important. And this is a whole new world for many of us in the medical field and most people watching this, I think. But just understanding how to use that information, I think is an important first step. And the fact that they’re actionable things that you can do to influence your health based on some of the things that we find in the genetic code of the individual. So thanks so much for sharing this. If people want to find out more about self-decode, and if they want to read some of the amazing articles you have on SelfHacked, what’s the best place for them to go?

Joe: Yeah, so you can either go to selfdecode.com, that’s where you
can get your genetics. You can go to selfhack.com, and read many, many hundreds; we have around 1250 articles online that are very comprehensive, very referenced and science based. And then we also have a lab testing company, that's labtestanalyzer.com.

And that's an example where, you know, we show you what the optimal ranges are for various lab markers, that are different than the reference ranges that you get. And we tell you how to get them into the optimal range. And so if we're talking about something for blood sugar, I think a common misconception for example, is -- and I don't know what your recommendation is, but I know that --

Every time I've heard somebody speak about blood sugar and the optimal levels, I hear something, like 80 nanograms per deciliter or something like that. It turns out if you actually look at the mortality studies, like the risk of dying from any cause, or cause mortality, the optimal fasting glucose actually is around 90.

**Dr. Mowll:** Interesting.

**Joe:** You know, the HbA1c, the optimal is going to be around 5 to 5.3 or 5.4. That's where you also have the lowest mortality or the lowest risk of dying. So the HbA1c, the alternative and the conventional, I think they get that pretty much right. I mean, some people might go a little extreme and say under like -- I think 4.8 is the minimum you want to do because actually mortality goes up; the risk of dying goes up if it's too low, usually because of some other health problem that's causing it.

But essentially, 4.8 to 5.4 that's a healthy range for HbA1c. But there are certain markers that I think there are misconceptions about, like fasting blood glucose where 90 is actually the optimal for lowest risk. So that's what you have to check, you want to make sure that your HbA1c and fasting blood sugar are good, and keep your other markers optimal.

**Dr. Mowll:** Very cool. So it's Joe Cohen, and learn more. It's selfhacked.com, selfdecode.com and labtestanalyzer.com. Joe, thanks so much for being here with me today.

**Joe:** It's a pleasure. Thank you.
Dr. Mowll: All right. So I’m here with Jonathan Bailor, who’s a wellness engineer, and the creator of SANE Solution. And we’re going to talk today about diabetes and diabesity. And I know you have a unique personal story as it relates to diabetes. And this is something that you and I are both very passionate about, where does that passion come from, for you?

Jonathan: One of the foundational moments in my life, I was a young man and I was in the hospital. My grandfather was having a really, really rough time. And I remember I was in the hallway, and I was actually reading a comic book, and I heard my grandfather scream out, “Don’t let them take my leg, please don’t let them take my leg.”

And I was 4 or 5. When you’re 4 or 5, you don’t even know how to process that. You’re like, “What do you mean they’re going to take grandpa’s leg?” I don’t even understand what this means. So I start crying. My mom comes out in the room, she’s like, “Honey, it’ll be okay. It’ll be okay.” And my grandfather was like a superhero to me. He was like super well respected in the community.

So his parents came over from Poland, he didn’t have a high school education, he worked in a factory his whole life. And all four of his children went on to get master’s degrees or greater. I mean, just a pillar of the community, and literally a superman. But unfortunately, that day
that I heard him make those tragic cries. That was the last time I saw him alive. And because my mother and her siblings, they respected his wishes, they did not -- he had diabetes and endosepsis in his leg. And the choice was take his leg off, as diabetes is the most common cause of preventable amputations, or he will die. And they listened to his wishes. And my superhero was defeated by diabetes. So that lit a fire inside me to just say, like -- literally, he had the choice to either have his leg cut off or die. And that's not a choice anyone should have to make, especially with a disease as preventable as diabetes.

**Dr. Mowll:** So you've done a lot of research in this area, you've talked to a lot of other experts, and done some great programs to help people prevent diabetes and beat diabetes. What are some of the most important things you've learned? What do you think is the problem, really? And then, if there is a solution that we can talk about here in the next few minutes? What have you learned there?

**Jonathan:** The most surprising thing that I've seen in the past, I'd say, four years of really working deeply to help people to reverse this deadly disease, is a lot of people think that it's a food problem. And I've actually I would characterize it more as a shame and self worth problem.

And what I mean by that is, yes, there is no question that our dietary choices have a tremendous, almost, I dare I say, causal effect on the development of this disease, but what's driving our food choices. And we live in a culture of never enough, you're never good enough, you're never smart enough, you're never strong enough, you're never skinny enough, you're never successful if you're not making enough money, and it applies equally to men, as to women. And we then find that we need some way to numb that pain.

I mean, nowadays, we're seeing people numbing it with the opioid epidemic, or they numb it with sex, or they numb it with workaholism, or they numb it with alcohol, or most commonly, they numb it with processed sugars, starches and fats. So they're using processed sugars, starches, and fats as a way to deal with this underlying sense of, I'm not enough, I'm not high quality.

And the irony here is that, first, if we can change our mindsets to really understand that; I promise, you're not low quality, you are high quality, you have the capability to transform lives, you are high quality. And once you get that you have nothing to be ashamed of, then eating high quality food, which is a key treatment for this disease becomes radically easier, because you know you're high quality, and therefore you deserve high quality.

**Dr. Mowll:** That is such an important thing that I think is getting almost no attention. Doctors are not teaching this to their patients with
diabetes and blood sugar problems. But I really believe that you hit the core there, because people want -- they kind of know what to do. They want to do the right thing, yet they don't do it many times. And there's an underlying reason for that and I think you just hit it. So how do we fix that? You know, how do we tap into that as a root cause? And how do we re-pattern ourselves so that we can do the things that we want to do for our health?

Jonathan: This was a recent breakthrough that we made on my team. And that's to reframe the diabetes diagnosis. And this is new, so I may not nail it. So this is cutting edge. But for example, even the language we use, so if you find out, for example, there's a lump on your breast, and the doctor says, this is cancer, and it's serious. And we need to fight this and we can beat it. Like that's the language we use with a cancer diagnosis. This is a problem, you're not a problem. This is a problem and we need to fight this and we can beat it. They don't talk about managing your cancer. They talk about beating your cancer, because you can.

I'm here to tell you strongly, you can beat diabetes, you can fight diabetes, and you're worth fighting for. I know you've seen this, you can absolutely. I'm on Metformin. Within months, I am not on Metformin anymore. And we can't say cure, I'm not going to say cure, but I am going to say you are on medication for a medical condition. And you're no longer on medication for medical condition. And that can happen in months. And it can happen without any wacky stuff. It happens by treating yourself as the high quality being that you are.

Dr. Mowll: So that's hope; you know, we're starting with incredible hope instead of loss of hope, instead of this is something you're going to live with forever and just manage it like you said, which is all too often the message. We're changing the initial message to, “You don't have to live with this. You don't have to live this way. There's something that you can do about it. Take action, and change the outcomes.”

Jonathan: You can live better, I promise. The first and most important thing is trying. And I know that we could spend all day on this part, but believe that you're worth fighting for. Because this will kill you if you don't fight for yourself, and you're worth fighting for, promise. Like, if not for you, for those people who depend on you or the people who love you or the people who will/or could love you in the future, you're worth fighting for.

And the second thing and this is might sound a little bit boring, but Dear God, eat more vegetables. Stop worrying about, “Don't do this. And this is bad and these things are evil.” Every time you eat food, eat non-starchy, colorful vegetables. I would argue and a lot of research supports that that is the most effective treatment with no negative side effects, only positive side effects for diabetes care.
And then the third thing would be, I would strongly encourage you to explore alternative methods to prepare baked goods and/or sweets. Some people think that they can never experience the taste of sweet again. And that's the only solution to this. I'm here to tell you that there are things like coconut flour, almond flour that are decadent and delicious.

And not only that, coconut, and cocoa or cacao; these are some of the most healing foods on the planet. And if you use these things with alternate sweeteners like stevia or erythritol or monk fruit or Lobongo and you're surprised; what kind of crazy crap is he talking about right now.

The good news is, this is such a widespread epidemic that the ability to find recipes that allow you to create delicious dishes that will actually help to reverse diabetes is possible. So you don't have to say I can never enjoy anything that tastes good ever again. Just look for smarter, saner options in those categories.

Dr. Mowll: Well, Jonathan Bailor, thank you so much for being here with me today. This message is so important and we really want to help spread this. So if people want to find out more about what you do, and dig deeper into some of the tools and resources you have available, what's the best place for them to go?

Jonathan: Please go to sanesolution.com.

Dr. Mowll: Okay, great. Thank you, sir.
Dr. Mowll: All right. So I’m here with Dr. Jolene Brighten, who is a hormone expert. And we’re going to talk today all about hormones. And you have, I think, a unique way of looking at hormones, particularly women’s hormones. So how can we relate female hormones, blood sugar, diabetes, how does all this fit together?

Dr. Brighten: Yeah. Well, this is something that's so interesting is that, you know, we'll see often where clinicians are chasing estrogen, chasing progesterone, chasing testosterone or sex hormones, and yet their patients aren't getting better. And why are we doing that? Well, because that's the symptoms that women are presenting with, and they want help with.

Now, when I talk about hormones, the way I like to describe it is like a pyramid. And at the base of your pyramid, you have your adrenal, and you have insulin. And if the pyramid is not stable, so if you’re not caring for your adrenal glands, you’re not eating regular meals, you’re not tending to your blood sugar regulation, you’ve got an unstable foundation. Know right above that, is where we have our thyroid.

So the next level up is thyroid. And then right the tippy top is where our sex hormones lie. And so you can imagine that if your insulin or your adrenal glands, they’re struggling, and that pyramid is not solid in its foundation, then that little top is going to tumble right over. And if you
keep coming in with therapies to try to address estrogen, progesterone, testosterone without paying attention to the foundation, you're really never going to get much traction. And as we see in women's health, really, insulin and adrenal hormones are just about everything and how they interplay with all hormones in our body. So if we're stressed out, the brain will actually signal to the body, let's preferentially make cortisol over progesterone. And if we're not making progesterone, that's where we have our PMS symptoms.

So we're feeling bloated, moody, we can't sleep, maybe you're even having hot flashes and anxiety. And those kinds of symptoms are what we want to get symptom relief, we want to treat for sure, however, it may be rooted in what's going on with the adrenal glands. And so addressing progesterone over and over isn't really going to do the trick.

Dr. Mowll: So there's a hormone pyramid, if we could just maybe describe that really clearly so people can kind of visualize it and see it. So the base of the pyramid is what?

Dr. Brighten: So the base of the pyramid -- we think about it, we're going to cut it into three layers. The base of the pyramid, that's where adrenal glands and insulin come in. And those two really, I mean, if you don't have good blood sugar regulation, forget it. All bets are off with your adrenal glands. So that's the foundation. The next layer up is thyroid health and thyroid function. And the very tippy top of the triangle is where you find your sex hormones.

Dr. Mowll: Okay, interesting. So the idea is, as you just described, if you don't get the base right, the top is almost impossible to get right.

Dr. Brighten: Absolutely.

Dr. Mowll: So insulin and adrenal hormones. So let's talk about insulin because most people have blood sugar problems and diabetes, certainly, that's on their radar. So how do we optimize insulin levels in the body?

Dr. Brighten: Well, as I was talking about with the stress response alone, you know, if you are somebody who is skipping meals, not sleeping, or you're just bananas stressed out in your day, your adrenal glands are going to signal to the liver to release sugar. And as it does that, then insulin has to come out to play.

But the problem in all of this is that inflammation usually comes into play as well and stresses the system further. And so as insulin keeps knocking on the door, we see issues with insulin resistance, inflammation goes up, we see the same thing, then we stress the adrenal glands. And as all of this takes place, the adrenal glands may
be firing off DHEA, which is an anti-aging hormone that you can also convert into testosterone. And then insulin will also drive testosterone production.

And if your enzyme 5 alpha-reductase is up-regulated, you have a perfect storm for losing hair on your head and growing it on your chin, chest, and abdomen, and also developing acne. And that acne won’t necessarily be isolated to the face; it can show up on the back, on the neck, and even on the chest.

**Dr. Mowll:** Okay. So these are some of the symptoms that will show up when those hormones are dysregulated.

**Dr. Brighten:** Yeah.

**Dr. Mowll:** Okay, particularly insulin driving that estrogen response that you just described.

**Dr. Brighten:** And that’s what we see in polycystic ovarian syndrome, is that’s really rooted in inflammation and insulin dysregulation. So it’s a metabolic disorder that presents with hormonal symptoms. Often, you know, women want symptom relief, it is not going to be a long term solution to only address the sex hormones. We really have to go to the base of the pyramid once again and look at that inflammation, insulin dysregulation, and adrenal glands and how the ovaries are over producing testosterone.

**Dr. Mowll:** So you talked about several things to help the adrenal glands. Are there any other tips or suggestions you have for people who already know they have some adrenal dysfunction since that’s at the base of the pyramid?

**Dr. Brighten:** Absolutely. So vitamin C is kind of the unsung hero of hormonal health. Vitamin C is concentrated in several tissues in the body, and the adrenal glands are one of the highest concentrations of vitamin C in the body. So your adrenal glands need vitamin C. But in addition, for women who are ovulating, or women who are wanting to keep their progesterone around longer build healthy progesterone levels, you need vitamin C to be able to accomplish that as well.

And so bringing in vitamin C rich foods. Yes, oranges have vitamin C, but actually, you’re going to find more vitamin C in a bell pepper than you’ll actually find in an orange, which is going to be much healthier choice when it comes to blood sugar regulation for a lot of people. And so increasing foods with vitamin C and considering supplementing with vitamin C, can help adrenal function and ovarian function.

**Dr. Mowll:** So we described this in a little bit of a different way. And
I talked about using long levers and short levers to help our clients and patients. And so if a woman or a man, for that matter, comes in with some hormone dysregulation, sex hormone dysregulation, the short levers would be; well, let's start adjusting and balancing all these different hormones. But the long lever might be actually fixing the adrenal glands and the underlying blood sugar issues.

**Dr. Brighten:** Absolutely. I think every clinician has to work with people in managing their symptoms, so they feel better quicker. So they can do the root cause work. Like, what does it take to do root cause medicine and to really reverse these chronic conditions? It takes energy and effort. And if you’re not managing your symptoms, how will you have the energy and effort to get into the kitchen and to make that meal that’s going to be a healthier choice for you?

**Dr. Mowll:** So if somebody who’s worked through the primary level, the base of the pyramid, and they’re kind of working their way up. What are your recommendations for actually addressing those hormone imbalances if they’re still dealing with some of those?

**Dr. Brighten:** Yeah. So we want to look at thyroid function, and the first thing you need to do is have a complete thyroid panel. So TSH is what your brain says to your thyroid. So under found that if your doctor only measures TSH, they’re not measuring thyroid function, they’re measuring brain how it’s signaling to your thyroid gland.

So you have to follow up and test free T4 and free T3; free T3 is going to be your mood, your metabolism but also why we have regular periods and we can be more fertile. Now, if your thyroid is struggling, you’re going to see your sex hormones struggle, as well. We see increased incidences of miscarriage, infertility, weight gain and a lot of things that can sometimes be attributed to cortisol or to estrogen dominance. And it really lies in thyroid gland function.

Every single woman needs to have antibody testing; anti TPO and Anti thyroglobulin testing. And if you’ve ever had this testing, and it’s come back negative -- if symptoms come up, you absolutely need to test again because autoimmune disease can be triggered at any point. And we know that the number one cause of hypo, which is low thyroid function, the most common kind of thyroid dysfunction, is due to an autoimmune disorder known as Hashimoto’s.

So women need to be screening for these things because just having elevated TPO antibodies without thyroid dysfunction, so your thyroid is still operating fine. That actually is correlated with the increased incidence of miscarriage and inability to conceive. So it’s a very important marker for us to look at.
Now, if your thyroid gland is functioning optimally, and you're like, “I'm still having PMS, and I'm feeling terrible.” We certainly want to address that and look at, well, are you estrogen dominant? And with estrogen dominance, there are a couple of times that we can be working with.

One is, you can have Frank estrogen dominance, so you're making way too much estrogen, perhaps, because of environmental toxins. Maybe it's because you don't poop every day and you're not moving your estrogen out. We know dysbiosis in the gut can re conjugate, that means re-activate estrogen and put it back into circulation. But something most people aren't aware of is that your fat tissue will actually make estrogen, as well.

And the really interesting thing about fat tissue increase our adiposity as we know it, it's correlated with increased incidence of insulin resistance. It also can cause dysfunction in the adrenal glands and our sex hormones overall, just by way of being an endocrine organ itself. And so we have to look at, is it Frank estrogen dominance, or is it relative? Is it that you're not ovulating? Or when you ovulate, that progesterone is not getting up to ample amount? Now you've got a relative estrogen dominance. Estrogen is fine, but you don’t have enough progesterone to really balance it out all together.

**Dr. Mowll:** Wow. This is fascinating. And obviously there's a lot here to uncover, to dive into. So if people want to read your book, where do they get it? What's it called? And how do they find out more about you?

**Dr. Brighten:** Yeah. Well, you can find me at drbrighten.com; that's my main hub. *Beyond The Pill*, is the name of the book and you can find it in drbrighten.com or anywhere that they sell books. And if you are grabbing the book, please grab the gratitude bonuses at beyondthepillbook.com. Those are my gifts for women who put their hands up and say I want to make change in women's medicine.

Then, of course, you can find me on Instagram at Dr. Jolene Brighten, and I have educational videos on YouTube, as well. So thank you so much for having me.

**Dr. Mowll:** Definitely is a great pleasure. Dr. Jolene Brighten, thank you for being here.

**Dr. Brighten:** Yeah.
Dr. Mowll: So I am here with JJ Virgin and we’re going to be talking today about sugar in particular and how it relates to diabetes. This is a topic that I think should be very important for most people watching this but it's something that really needs to be talked about in more detail because people really have problems still with sugar.

And one of the main things is, they have cravings for not only sugar but carbohydrate foods, packaged processed, refined foods. And one of the hardest things as they’re working on getting over diabetes, trying to reverse diabetes, trying to get their blood sugar under control, is breaking through these cravings. What tips do you have or what do you think is the best strategy for addressing and overcoming sugar cravings or even sugar addiction?

JJ: Okay, so here's the great news, it can be done. That's the important thing to first start with because sugar is our number one recreational drug of choice. I love that line, its Doctor Mark Hyman’s. Credit where credit is due. And I heard that I'm like, “That’s good.” But so I think we have to go all right, knowing that how are we going to handle this?

And you mentioned sugar and carbs and of course as we know all carbohydrates except for fiber turn into sugar. We just want to look and go, are we mainlining it or are we making it slowly from the foods we eat? Which is the super key thing that we want to do. The other
challenge is, we do have those genetic sweet tooth, sweet taster genes. So genetically there are people who have more of a sweet tooth.

I’m adopted. My adopted mom is a massive sweet tooth person. My nickname was Poppy. I was raised on Pop-Tarts, raised on those sweet rolls, all these stuff. I actually don’t have a sweet tooth, but it can be trained; exposure equals preference. Which is the problem with a lot of these, I mean there’re so many problems with artificial sweeteners but one of them is training us to want more and more sweet.

And so when I looked at all of this, the biggest question I got asked after I wrote The Virgin Diet was about sugar. And what I noticed was people were either confused, they were like, “But it’s all natural. It’s honey.” I’m like, “But what’s honey doing once you eat it? Your body isn’t going, no worries it’s honey. Don’t worry. Don’t raise your blood sugar, don’t raise your insulin, its honey.”

That doesn’t happen as we know. Or they were going, “But there’s no calories it’s blender its fine,” or they were just controlled. They were like, “I know I should not be having this, but I can’t do anything about it.” So I was determined to fix that. And so what I did is, I took 700 people who basically said, “I’m a sugar addict. I cannot quit.” So I did not make this easy on myself, but I figured if I couldn’t prove this to work then there was no point in going further.

And I went and I looked at all these programs that promised that they would help you get off sugar and I started to read the negative reviews on Amazon, not because I wanted to be mean, I wanted to see what wasn’t working. And what I saw wasn’t working is this, if you are letting sugar sneak into your diet and if you’re not aware you probably are because it sneaks into the silliest places as you know. Like marinara sauce can have more sugar than Oreo cookies.

And so if you’re not being super mindful, if you’re not totally aware, you probably have a lot of sugar sneaking into your diet. If you do and you got any other cofactors like poor sleep or stress, lack of exercise, you probably have some problems with blood sugar and problems with insulin resistance. So when you have those things, it makes your body really struggle to burn fat for fuel and stick you in being a sugar burner.

Well, if you’re a sugar burner which means you’re always relying on that next hit of carbs to be able to keep your energy up and you pull all that out, you’re going to crash and you’re going to go rushing for the soda or the cookies or the whatever. So the first thing we have to do is create some metabolic flexibility like getting you shifting from being a sugar burner to a fat burner so that you have some control otherwise you’re setting someone up to fail. The other thing we have to do is retrain your taste buds to appreciate natural sweetness like eating a blueberry
and going, “That’s sweet.” I mean my mother raised me pretty sugar on strawberries, I’m like, “We don’t eat sugar on strawberries they’re already naturally sweet.”

So the way I have people start this is first, to eat by what I call the trifecta. So good fats, optimal protein, not loads of protein, but an optimal amount of protein and then lots of fiber for what I call low sugar impact carbs. So those will be things like lentils, wild rice, squash, black beans. Lots of non-starchy vegetables but things that are higher in fiber and low in what I would call a big sugar impact. They don’t make sugar quickly, they don’t turn into sugar quickly.

So that’s the first step because it’s going to help stabilize blood sugar, but the next thing is how can we retrain your taste buds? And I have a great hack from Donna Gates everybody in what she said, is like, that’s good. I had her come over and we did some cooking videos together and she showed me how to make fermented food. And I literally have this video of me like Tom Hanks and be going, you know?

And I was like going, well the fermented food I really like is wine. Other than that I really I’m really like yuck. But one of the things she showed me is that lemon that’s sour, because that’s one of the things you get from fermented food, and that lemon can actually take your sweet tooth away. So one of the hacks I have is to take some lemon juice which also works really well because it helps lower the blood sugar response to a meal.

So a couple of tablespoons of lemon juice, a little bit of what I would call an approved sweetener like Monk fruit or Stevia or Allulose but not much, like the tiniest bit because you don’t want it to be sweet, you want it to be sour. Some glutamine that kind of tricks you into thinking that you’ve had something to eat and then some fiber like chia. And you drink that, it’s going to make you less hungry for your meal, better blood sugar response to meal and the sour helps take the sweet tooth away.

While you’re training your taste buds to start to appreciate savory and spicy and salty rather than everything that’s always sweet, which really kind of drowns out. It’s like being at a rock concert and then coming out and trying to hear, it’s the same with all that sweet. It just kind of kills your taste buds. They don’t appreciate anything anymore. So that’s kind of the simple way to do it, that’s simple but not easy.

Dr. Mowll: These are great tips. Strategies that people can use because they pretty much know what to do. I mean you’re watching this. You understand you shouldn’t be eating sugar, but it’s how to do it. And so the other thing is, the carbohydrates, the refined, processed carbs, grain-based carbohydrates and you mentioned that earlier that this turn into sugar very quickly in the blood. So that’s the other thing that people
have a hard time with. People just love bread and for good reason, it's good.

**JJ:** Love bread, right? Like we're both sitting here, I'm sure the way you said it, I'm like, he loves bread. I grew up in San Francisco. I used to get a loaf, I kid you not, every day. My girlfriend and I, she liked the inside I like the outside. We would get a loaf of sourdough bread extra sour late baked. We would eat it every single day. A loaf of bread.

**Dr. Mowll:** And I grew up outside of Philadelphia and the Philly soft pretzels were one of my favorite things; chewy and sour dough. So people love these things and I don't think we're helping anybody with this discussion. So the question is, okay, we know these are good tasting but we know they're not good for blood sugar and health really. So how are their substitutes or their hacks or the things that people can do to try to place these or move past these types of foods?

**JJ:** So when I wrote the *Virgin Diet* it was years ago and really it was when the whole gluten-free junk food craze started. I think Will Davis had just come out with *Wheat Belly* and then it came up with *Virgin Diet* then all of a sudden there's all this gluten-free and its cupcakes and cookies. I'm like, “Wait, wait, wait. You weren't eating it before. This is not okay and we have to be careful.”

The reason I bring that up is these potato flour, rice flour, all these flours that are gluten-free are still high sugar impact they're just going to hammer you with carbs but there are good options. We have almond flour, and coconut flour but I still think the best options of all are like squash, avocado, cauliflower.

Like I think cauliflower rice is one of the greatest things that has ever happened to us. Like it's sliced bread I guess probably 100 years ago was amazing. And cauliflower rice is now incredible. And cauliflower rice that you can make into crusts and all sorts of stuff.

So I still would say, you want to start to really retrain your taste buds and appreciate things. I might have a little bit of a crust of sour dough bread. Maybe three times a year, if I'm in a really amazing place. Like if I'm in San Francisco, I will have a little bit of that carefully and with gluten digestive enzymes. But you want to make sure that on your regular basis, you have a little bit and you're like, “Oh, okay.”

But on a regular basis you just get used to what are all the good health things I can have? I think what we tend to do that's the biggest challenge we go, “Oh my gosh, I can't have that anymore and not that either.” The minute you start to look at what you can't have, what I first learned is that people can be really naughty. When you tell them they can't have all these things, they find even more stuff.
So the first thing I think we should start to look at is, why don't we start to add before we take away and then crowd out some of these bad stuff? So if you just start to add avocado, if you start to add grass-fed beef and wild fish, if you start getting more deep green leafies and maybe some squash. You start to add more of that, all of a sudden you don't have room for the bread, the pasta, all of those types of things. I mean as far as pasta goes that's one of the easiest ones to do healthy with.

All of the great noodle options now, it's incredible. Like those zoodles and they're amazing. And you want to do, you could do like a little lentil pasta and then mix it with either shirataki noodles, which I think are some of the coolest things out there. Aren't they amazing? And great for blood sugar control too. And then mix it with some butternut squash noodles or zucchini noodles and it's just fantastic. It's one of the things we make a lot, is that little blend.

**Dr. Mowll:** Great tips. Last thing is drinks because again people are used to drinking iced tea, lemonade, hopefully they've given up sodas long ago. But they want something other than water typically. So any suggestions for people who are looking for something good to drink?

**JJ:** We can get into so much trouble because I don't have a soda and they're having that green drink and that green drink has got 44 grams of sugar in 16 ounces. When you look at the places that sugar sneaks in, one of the biggest places is what we drink.

Now iced, and I always have to iced green tea, I've done enunciates because every time I'll say this people are like, “Ice cream tea?” I'm like, “No, not ice cream tea.” Iced green tea is amazing because it can help with insulin sensitivity, it can help your body with stress. It's got amazing antioxidants in it. So iced green tea is one that's fantastic. If you need something that's a little sweet, you can put a little bit of say a little squeeze of orange in there. Use a little bit of something like Stevia. Even though those to me are acceptable sweeteners, the herbs, you still have to be careful because it still wakes up your sweet tooth.

I think coffee is a healthy food. I think you do too, right? Yes, but again it's like you get people complaining about beef and it's not good for you. I go, “Well, if its factory beef that's a very different thing, grass fed and finishing pasture beef.” Same thing when you're looking coffee. Like coffee that is organic and mycotoxin free like our buddy Dave Asprey's, Bulletproof, that's fantastic. It is absolutely great and has been shown to be great for diabetes. So that's a good one.

It's really what you put into these things, that creates the problem. So put in some healthy fats you're good, put in some of that crappy flavored creamer or trying to make it non-fat skimmed milk skinny lattes,
you're fooling yourself. So coffee, sparkling water, shout out to Hint water I think that’s a great one to get. That’s my girlfriend you’ve met Kara. Iced green tea. There’s a great drink called Suja, I am absolutely addicted to this. It’s this lemon cayenne drink with a little bit of Stevia. And barely any calories; it’s mainly lemon juice, spring water, a little bit of cayenne so good for your metabolism too and delicious.

So that’s one of my favorite things to do. And if you’re absolutely one of those people and you’re trying to transition off of soda, step one I tell you to go to something like a Zevia, you know, a Stevia sweetened soda. And then start going to sparkling water with some of those Zevia, the little Stevia drops of something and then keep tapering on over.

But I like to do what I call a lateral shift or a swap, rather than going, “Okay, you’ve been drinking a super big gulp every day, just stop it and have water.” I’m like I’m not doing that, so let’s make it realistic. And then as far as alcohol goes, I just stick with Dry Farm Wines, our buddies and the occasional tequila and that’s it. It’s just in what you put in it.

Don’t put all that garbage in it, have a little bit of lime. And I mean I say this because this is how you can actually do this long-term because if you’re telling people, “No, you’re never going to have any of those things again.” They’re like, “Yeah, I'm out.” But if you say, “There’s places for all of these things, you just need to know the right ones to choose and you'll be fine,” they're like, “I can do this.”

**Dr. Mowll:** Very doable. Great tips, very realistic. And I think anybody should be able to follow that.

**JJ:** It’s how I live.

**Dr. Mowll:** It’s perfect. So JJ Virgin thank you so much. You have some great books and I think for people who want to find out more about this type of lifestyle those books are a great resource. So for this message that we’re talking about today, what do you think are some of the best books that you have?

**JJ:** Definitely *The Sugar Impact Diet Cookbook* is the one I would do the big shout out here because I worked with a team of chefs because I don’t like to write down anything. So I cook and it’s a complete flurry of stuff with now measurements whatsoever besides hand folds so I’m paying to, they had to take that and translate it. But that is where I’ve taken everything down and it is low sugar impact so everything is following that fat, fiber and protein trifecta and delicious stuff you could serve at a party and no one would know.

**Dr. Mowll:** Excellent. And your website for people who want to learn more about you?
**JJ:** jjvirgin.com, easy.

**Dr. Mowll:** jjvirgin.com. JJ thanks so much for spending the time.

**JJ:** Thank you.
Dr. Mowll: Okay, so we’re with Dr. Jill Carnahan. And today, we’ll be talking about mold, and diabetes, and blood sugar dysregulation. I think this is a topic that doesn't get enough attention because it is a fairly common issue. So can you talk about maybe the link and connection and what we should know about that?

Dr. Jill: Sure. Well, people don't realize that the toxic effect of mold, usually through trichothecenes, ochratoxins, aflatoxins, and others, these actually have an effect on leptin receptors. So what we see is we see often after a mold exposure a rise in leptin, a decrease in adiponectin and this basically diabetic predisposition happening. We also know that mold has a pretty profound effect on the gut permeability. And that endotoxemic effect is one of the predisposing factors of diabetes, as well.

Dr. Mowll: You talked about leptin. How does that relate to...You talked about leptin and adiponectin. Can you maybe expand on that a little bit and how that relates to blood sugar and diabetes?

Dr. Jill: Yeah, so adiponectin we know is a predictive factor for diabetes. So we started to look at adiponectin levels as they drop, they’re predicting diabetes. And leptin and adiponectin and always yin and yang. So they tend to, if one goes up, the other goes down. So we see leptin rise. Adiponectin go down.
Leptin is one of the satiety things, as well. So people get more hungry. They aren't satiated. And they eat more. And they become obese or gain weight. So often with this goes a weight gain or obesity. We'll see people who have mold exposure and gain 20, 30, or 40 pounds in three months like out of control.

And we also know that there's a link here to the intestinal permeability because mold will create more intestinal permeability. And then we'll have the lipopolysaccharides cross over and create an endotoxic effect. And we know now that endotoxemia, which is LPS levels in the serum rising after meals, is also a predictor of diabetes. So these all go together.

And leptin resistance is really bad in the sense that it blocks the ability of cells to burn fat so they have this double whammy of predisposition towards poor blood sugars, prediabetes. But they also have a problem with burning fats. So they gain weight. They can't lose weight. Even if they exercise or they change their diet, it can be really difficult.

**Dr. Mowll:** A lot of people, I think, just heard you say that because that's a common issue we see people have this weight-loss resistance. How does that leptin resistance relate to insulin and insulin resistance?

**Dr. Jill:** I know that the mold affects leptin, specifically, so it affects the leptin receptors. So mold toxicity will actually trigger leptin resistance. And then we also know that mold triggers intestinal permeability, which is a key factor in LPS-induced endotoxemia. So I think that mold toxin is what really causes the receptor damage in leptin and also the intestinal permeability which triggers this endotoxemic effect, which makes everything worst. So it's the toxin triggers the response.

**Dr. Mowll:** So what do we need to know about mold exposure? How do you know if, for example, you might be exposed to mold, or do you have to wait until you get sick, or there are some signs to look for?

**Dr. Jill:** So I often ask people if they have traveled or gone away from their home for a period of time, and they feel better. Or they come back home, and they feel worse. Or if multiple family members are sick with different issues: autoimmunity, congestion, sinus respiratory issues, brain fog is common. So the respiratory tract's affected, the brain's affected, the gut's affected. So you can have diarrhea, constipation, heartburn, any really number of things with the gut. Immune system's affected. So they'll often have decreased immunity and frequent infections, respiratory infections, or otherwise. Autoimmunity can be triggered. So they might have new onset of multiple autoimmune diseases. Skin, so they'll have rashes and histamine types of things.
One thing really interesting with mold is patients may have a lowering of antidiuretic hormone. And that can cause this sweating or salt grating on their arm, or their legs, or whatever, their skin. And this creates a human battery. So they might be breaking electronics or shocking the door when they touch a metal object. It's a strange thing, but they can actually like break watches because of the electrical gradient. Yeah.

Other things would be just the sudden onset of brain fog. Brain is probably the most directly affected. And then when they're in a certain environment and there's multiple people affected, that's always a good sign. Other things are just, have there been leaks in your house? Have there been water damage? People don't realize that a small leak could actually be a big issue. Crawl spaces that aren't properly taken care of. Storms that have invaded the envelope of the building. So water damage, or hurricanes, or things like that could all affect.

**Dr. Mowll:** So if this sounds familiar to people, they're listening to this and they say, “Maybe that is what’s going on with me,” what are the next steps as far as testing for mold exposure or for mold toxicity?

**Dr. Jill:** Yeah, and if there only were one test, right? I would be, “What’s the one test?” And there is not. But there are some things. Visual contrast testing can be done online for free. And they can check the visual acuity of the retina. And that actually is a predictor of toxic exposure. So if they fail, it doesn't necessarily mean they have mold, but they could have mold. So that's a screening they could do.

Some of the things we talked about were symptoms so brain fog, and gut issues, and respiratory issues, and skin issues. Mast cell activation can be a part of that. So they might have more itching, and rashes, and histamine reactions to foods, or whatever. But actual testing, you can do urinary and mycotoxins, those are really helpful. And if someone's been exposed, they'll often have elevated levels of trichothecenes or ochratoxins in the urine. So that's our test.

I'll often do labs, as well, like through a regular routine lab. And those are TGF beta is usually elevated, MMP-9 is usually elevated, VEGF is usually elevated, and MSH is usually lower. So there's a bunch of labs you can do that will predict an inflammatory response to mold. It's not simple. And then house testing you can do dust sampling, you can do petri dishes, and you can have an inspector, any of those things will work for the home.

**Dr. Mowll:** Well, this is certainly an interesting topic. And we're just scratching the surface. But if people want to learn more about this, do you have information that you put out? Or what's a good place for them to go?
**Dr. Jill:** I do. So my website tons of free stuff, all free, just JillCarnahan.com. And I actually created a Free Mold Guide because so many people ask, some people can't come into the office to see me. And so I have all the information about if you might get exposed to mold what to do. And I'll make sure you have the link, but it's downloadable. If you just search "Dr. Jill Free Mold Guide," it'll come right up.

**Dr. Mowll:** Okay, excellent. Dr. Jill, thanks so much for taking the time today.

**Dr. Jill:** You're welcome. Thank you.
Dr. Mowll: So I am honored to be here with Dr. Jeff Bland. And Dr. Bland we're going to talk today about blood sugar. And I would love to get your perspective on why we have this major diabetes epidemic and blood sugar problem that we have today.

Dr. Bland: Well, thank you. I think first of all, I want to really support and acknowledge your leadership in this field and how important, what you do with your patients, is in really fighting back against what has become not just a national problem, it's now become a global epidemic.

And so the question really is, why? And if I could just beg on your indulgence, I'd like to take you back just for a moment to an earlier period of my life where I was young man, believe it or not. I was back as a professor at the medical school; this is now in the 1970s. And this is the age of hypoglycemia in which people were really worried about low blood sugar that was caused by people eating high sugar diets, that their blood sugar would plummet after they ate these meals and these foods.

And so there was a big medical meeting on blood sugar sponsored by the medical school. And the lead presenter was the head of endocrinology that actually had written the textbook in medical school on diabetes, that I had studied from. So he was a world renowned leader. And I was this young buck, this young assistance of medicine and he was the big guy in the department. And so he was the last speaker
on this panel in these group of speakers in the morning and I was right
before him. Okay, wanted to put the young guy first and then he could
be the finishing guy.

And so I went up and I gave what I thought was a very impassioned
discussion about this epidemic of low blood sugar caused by the way
that we were eating our diets and the way that diets were changing in
the 70s with an increasing amounts of sugar and refined carbohydrate.
And that this was a progenitor or would progress on into diabetes if a
person had this problem. And then I finished. I thought I did a good job.
I was kind of proud of myself. I practiced a lot to be ready for this and
knowing this was a big formal meeting.

And then he stepped up and he said, “Well, you know, this Dr. Bland that
just spoke, this young professor, he's got a lot of good energy and he
clearly has reviewed the literature. But I have to pretty much say that
everything he said is not true. That really is, there is no progression from
pre-diabetes condition into ultimately diabetes. You either have it or you
don't. And it's a genetic condition and therefore this concept about diet
and blood sugar and sugar in the diet and so forth, it's a nice model but
there's just a bunch of non-substantiated non-scientific information.”

So that was 1975. I like to role forward to 2019. I think we would all now
know that over this period of time, as much as I really respected his
knowledge and his expertise that it's hard to know what you don't know.
And what we've learned over those subsequent 40 years is that actually
there is a transition from optimal regulation of blood sugar to ultimately
going through stages that we go through pre-diabetes and metabolic
syndrome finally into diabetes. So the question is, why is that happening
so much more frequently? Now that we finally acknowledge in medicine
that does occur, why is it happening?

And one of the reasons I believe that it's happening and I've used this in
a lot of discussions I've had with patients over the years, is I say sugar
is not bad. I mean in your blood we have this sugar called glucose. It
fuels your cells so it's not like it's a bad molecule to have blood sugar in
your body. You need so much to power all your cells. The problem really
comes with the amount of sugar that we're administering to the body
of which the body then has to manage because it can only tolerate so
much. So I ask the question, in a normal candy bar that now would cost
what? 50 cents, I'm not sure. I don't buy them but I think somewhere in
that range. How much sugar is there in a candy bar?

And I say, “Well, let's just use some round numbers. Let's say that there
is about an ounce of sugar, that would be a fairly small candy bar. And
an ounce of candy bar would be about 30 grams of sugar.” And then
I ask the question, in the whole of your body, in your whole blood
system, how much sugar is floating around there? And so you say, “Well,
it's about 100 milligrams," so it will be one tenth of a gram per 100 milliliters. So you say, “Well, I guess that there’s five liters of blood,” and you do some calculation, you might say “Well, five to 10 grams.” And then I say, “Okay, your candy bar, you’re eating 30 grams.” 30 grams compared to your whole body’s amount of sugar in your blood of five to 10 grams?

What happens when that all gets absorbed rapidly after you eat the candy bar? Well, it’s like a fire drill. Your body says, “Oh, my word, I've got to get this sugar somewhere because if it gets too high it’s going to produce all these problems and therefore I've got to call out the guard,” which is the fire department, “To get sugar put somewhere.”

And so what it does is it stimulates all the fire putter outers when your sugar is high which is your endocrine system, your beta cells of your pancreas and you secrete all this insulin. It rushes out in your body and glucagon in the counter regulatory hormones. It’s a very complex process and it’s shoveling the sugar molecules in all sorts of places that would normally not absorb them at the level that they’re being pushed in.

And now, what happens over time by doing that repetitively, is you kind of wear out the system. And that’s called insulin resistance or glucose resistance. And now you just don’t have enough things to call out the fire department. They’re all on vacation and they’ve retired and they can’t put the sugar anywhere. And now you get hyperglycemia, which is diabetes, but in the intervening period you’re putting sugar in places in your body that shouldn’t be like in your coronary arteries and into your kidneys and into your eyes and into your nerves. And so what do you start seeing as a side effect? Neurological problems, ocular problems, vision difficulties, kidney problems, blood lipid problems, cardiovascular disease.

So even the brain that we now recognize as the principle fuel for the brain is sugar glucose. And so now it’s having a problem with managing its energy. So this epidemic that we have, is a consequence of just overloading the system with things that get absorbed so quickly and our body wasn't designed to manage on a repetitive basis that kind of exposure.

And then we start saying, “Well, what do we do about it?” And in medicine what we start doing about it is say, “Well, we need to assist the body to get that sugar put somewhere, so we better find drugs that will modulate this process.” And in one of those drugs then has its own attended side effects that produces a problem.

And so now we have, what is it? I think in the United States 12 different classes of drugs that are now recommended or approved by the Food
and Drug Administration for the treatment of these conditions. None of
which really treats the cause they treat the effect. So anyway, that's my
kind of story of how we got to where we are today.

**Dr. Mowll:** It's really interesting and 30 grams of sugar would not be
uncommon to eat. I mean, that's two slices of white bread, you have a
sandwich and boom you got 30 grams of sugar. Not maybe in the form
of sugar but as soon as it starts breaking down through the salivary
amylase in your mouth and then into the gut, it very quickly gets
absorbed as sugar. So I think people do commonly eat that amount of
sugar and then more on top if and more on top of it. And you can clearly
see why we're in the predicament that we are.

**Dr. Bland:** Well, if you take 130 pounds per person per year which is the
average approximate sugar consumption. So you say, let's see there's
365 days a year. So that means we're eating a third of a pound and a
pound 454 grams, that means we're eating over 120 grams a day, not
30. 120 grams a day of sugar in the form of corn syrup, sweeteners, and
sucrose and so forth. So that's not even talking about white bread. That's
just talking about sugar.

**Dr. Mowll:** Right, that's not the starch exactly. And then on top of that
I think we're moving less. So we're not burning as much sugar and
therefore we've got to put that sugar somewhere as you said. And leads
to that glycation and damage to these proteins in the brain and the
blood vessels and all the complications that we see with diabetes. And
hence we have this massive globe.

**Dr. Bland:** I mean isn't it interesting that one of the new tools that you
have for treating this with a drug, is a drug that affects the kidneys to
cause sugar in the blood to be released into the urine. Now, isn't that
a strange thing to think about? That the way you're going to treat this
problem is, okay well we're not going to change the amount that's
coming in, we're just going to alter the kidney function actually in a very
dramatic way so that it dumps the sugar into the urine. Now we make
sweet urine which has its own effects because now it feeds bugs in our
urinary tracts and we get urinary infections.

**Dr. Mowll:** It sounds very convoluted and it is. But again, I think when
the medications are the only tools in the tool bag, then that's all we have
to work with. Fortunately, there are many more tools that we could
add to the tool bag and that's where personalized medicine, functional
medicine I think really come in and play a huge role. So how do you see
using personalized medicine to be able to help people with diabetes and
blood sugar?

**Dr. Bland:** Well, first I want to complement you because when you
talk about tools in the tool bag, you're a master of understanding what
those other tools are. And I know it hasn't occurred as a consequence of your formal medical education. Because having been in medical school professor myself for about 12 years, I recognized that this was not really discussed in any great length. You can go through a whole curriculum of medicine, even go on especially with the endocrinology.

And some of the things that now you know are commonplace that you would use or give as options to your patients were not discussed at all about diet and lifestyle. Well, it’s a travesty but fortunately there’re enlightened people like you that are changing the equation.

So I think personalization is a very important part of this story because what often happens when these things start to become understood by the general consumer, the non-medical public, they can be reduced down into a simple story which makes it palatable for people who are not medically trained, but may also simplify it to the point that it loses some of the important information along the way.

And so it leads us often to these debates that we see with book writers in the media about what’s the perfect diet, as if there was a perfect diet for all people to manage body sugar. There’re certain principles, I think, that are applicable. But people vary so significantly one for the other.

And I’m really called to this over some work that’s been done that I know you’re familiar with. This started in Israel at Haifa University and Weizmann University, where they were actually looking at the effect that different foods had on blood sugar and they were doing it in different individuals.

They did a very dramatic study, a really complicated study. 840 presumably healthy individuals, they measured their diets and all the foods they were eating carefully for sixth months, they measured their blood sugar after eating there’s postprandial meaning post eating. They measured their activity levels, they measured their gut microbiome, the organisms that inhabit their intestinal tract. And they tried to understand if there was a way that they could predict how food in an individual would affect their blood sugar.

Assuming that maybe it would be just a simple equation, that they could get this food produces this effect. And this comes back to what’s called glycemic index; that a certain food produces a certain effect. And what they found was that there’s an unbelievable variation from people to people on the same food at the same amount and how it influences their blood sugar.

And then they started saying, “Well, hold up. Why would that be? We have these general rules that this food is going to do that to your blood sugar and that food’s going to do something else. But now we’re
seeing that there's a variety of effects in the different people.” And what they found is that it's influenced by our gut microbiome. And by actually sampling the gut microbiome, they were able to use a complex algorithm, an equation to predict how a food in that individual, prepared in a certain way, would influence their blood sugar.

Now, at first in the traditional endocrinological field people said, “That's ridiculous. That can't be a predictor. What your gut microbiome is, is going to predict how you respond to your diet.” But now with extensive duplication of these studies and other investigators now in the top journals and high peer review, it's been proven that the gut microbiome has a huge role to play which is individual to each person in how a certain food is going to influence their blood sugar. So it's not just the rule for every one of the diet that's perfect, it's the diet for that individual. So here is where personalized healthcare and personalized lifestyle medicine becomes very important.

**Dr. Mowll:** It's absolutely fascinating and we see this clinically. A certain diet will produce different results in different people. And not everybody should be on a keto diet or a plant-based diet or even necessarily an ultra-low-carb diet. There are general principles of course. You certainly want to avoid process, refined, packaged foods, added sugars and so forth. But when we get down to the details, I think it really does vary from person to person and there's a lot to be said for that.

**Dr. Bland:** It's very interesting to me for 12 years I had of research clinic that was doing clinical research on lifestyle medicine and nutrition. We used to have about 4000 patient visits a year so it was a pretty busy research clinic. And what I observed over those years and it was really demonstrated by the clinicians and the nurses and the dieticians we had working in the clinic was that, there were some people whose blood sugar seemed to be very responsive to the amount of carbohydrate in their diet and others that were very responsive to the amount of protein and the type of protein in the diet. So there're certain amino acids and certain types of dietary protein in certain people, had a bigger blood sugar raising effect than even simple carbohydrate, which we found very interesting.

So, I believe what you're saying is very important when we start helping a person to really get optimal outcome from their diet and lifestyle to make sure that we're personalizing, we're using these general principles. But then really looking at how they're responding and not just saying, “Well, you must be cheating on your diet because you're not getting the response I thought.” No, they may be doing it well but they have a variable effect.

**Dr. Mowll:** And then even beyond diet, there're so many lifestyle factors that we can improve, change, address, that will help people with their
blood sugar. So we look at stress, for example, and sleep quality. You mentioned the microbiome in the gut and other things that drive inflammation.

We can look at hormone balance, stress in the adrenal axis. There’re so many things there that I think in some ways, I mean the approach to help blood sugar seem simple, in other ways it’s really very complex. And again, I think these different factors, toxins as well we were talking about earlier, these different factors may be a big deal for one and might not be for someone else. So I think there’s a lot of value and really helping to understand and get to the root cause.

**Dr. Bland:** I really support what you’re saying. And it’s so great that we have people like yourself that have spent the time and extraordinary amount of, I guess you’d call it diligent above and beyond expertise, to develop an understanding of how important this is.

And hopefully eventually this will become a standard of care because this concept of lifestyle diet and environment place now an irrefutably important role in determining outcome of people’s health over their course of living. And we spend so little time in medical education really as they say, if we don't test on the certification exams then people won’t learn it. And these questions aren't even on exams so it's like, why should I spend any time? Must not be important to learn this.

And then we get into practice and as you know there could be some dissolution that saying, now hold on, all these tools that I thought I was going have that would remediate these problems, they don't all work quite as well as I thought. I'm going to have to look at these other ways of really addressing the problem. And enlightened docs like yourself are the front edge of this new personalized healthcare movement.

**Dr. Mowll:** Dr. Jeff Bland, thank you so much. And I just want to honor you. I think that functional medicine and personalized medicine are absolutely the way of the future and way of the present. And as you said, hopefully this will become the standard of care. One day we'll be able to address these things and really make a huge impact on people’s lives. I know we're doing that now, hopefully we can have a bigger impact as time goes by. And I just want to honor you for your major contribution to all of our lives and the way we practice medicine.

**Dr. Bland:** Well, I'm very appreciative and I want to thank you right back to you for the work you’re doing with your patients.

**Dr. Mowll:** If people want to find out more about the work you're doing and want to learn more about you, what's the best place for them to do that? I know you have some books and things.
Dr. Bland: Like all of us have a website; jeffbland.com so they can go there, or they can go to our Personalized Lifestyle Medicine Institute. Or we have all these videos of all of our meetings freely downloadable, all these experts in the field. And you can probably overwhelm yourself with information. That’s the Personalized Lifestyle Medicine Institute. You can google this and check in there.

Dr. Mowll: Dr. Bland, thank you so much.

Dr. Bland: Thank you so much.
Dr. Mowll: I'm here with Dr. Jason Fung, a nephrologist and diabetes specialist. And really, I think the main thing we want to talk about today is fasting, diabetes, and blood sugar management. This is something that I know we've talked about before. And it's a great strategy. Important strategy to help people get blood sugar and insulin levels under control. So, would you mind just sharing, perhaps a little bit of sort of the rationale, of why someone would want to do a fast if they have diabetes or blood sugar problems?

Dr. Fung: This is important to understand, this is type 2 diabetes we are talking about. So, that's luckily the majority of type 2 diabetes. And you have to understand what the disease is. If you think about the disease of type 2 diabetes, it's really about just too much sugar, both glucose and fructose, in our bodies. So, it's not just in the blood. But it's all over our bodies.

So, if you take a medication like insulin, for example, that is going to force the blood sugar from the blood into the tissues. While you haven't gotten rid of the sugar. It's still in your body. So, you're not going to get better over time. And if you think about what we do for a lot of type 2 diabetics is that we give them a drug like insulin. And then the main side effect, which everybody sort of knows, is that you gain weight. As you gain weight, you're going to have worse type 2 diabetes. Which is going to require more insulin, which is going to make you gain more weight. So, you are constantly getting worse and worse. And guess what? That is
exactly what happens in the standard treatment of type 2 diabetes. And everybody knows that type 2 diabetes is actually a reversible disease. If people lose weight, then that diabetes very often goes away. We see it in our studies of bariatric patients. And you see it, you hear stories. People are like, “Oh, I lost 50 pounds. I got off my drugs.” And nobody says, “Well, you’re just lying.” Obviously, if you lose weight, the diabetes goes away. So, if those drugs are making you gain weight, you are getting worse. And that’s why. Because they don’t get rid of the sugar. They just simply force that sugar into our body.

So, the way to understand type 2 diabetes is you think about your body like a sugar bowl, right? So, over time the sugar sort of goes in and it piles up. At some point, the sugar comes in and the bowl is full, it is going to spill out into the blood. And that’s what you see. You measure it as a high blood sugar. And then you get called diabetic.

And so, if you think about the actual disease. The wrong thing to do is to take that sugar, which is what insulin does. It takes that sugar that’s in the blood and simply crams it back into your body. And so, you send that sugar sort of all over the place into your toes and to your kidneys. And over time, like ten years, twenty years, all your organs actually just start to rot away. Because there’s just too much sugar.

So, if you understand that really the disease is just about too much sugar, there’s only two things you need to know. One, don’t put more sugar in. And that’s why we use low carbohydrate diets. And two, burn off that sugar. If you let your body just use up that sugar, it’s just going to go down and down and down. And then after a while, you know, the bowl is emptied a bit. The sugar goes in, it doesn’t spill out into blood, and all of a sudden you don’t have type 2 diabetes anymore.

So, it’s really a very simple concept is that you’re letting your body use up that excess sugar. So, if you don’t eat, your blood sugars will drop. Everybody understands that. And so, it’s like if that’s true. Then why can’t we use it instead of drugs? So, instead of putting somebody on a drug. Why can’t we say, “Okay, let your body simply fast. So, your body is going to need a source of energy.” First source of energy is going to turn to all that sugar that is in the blood. That is the most easily accessible. That’s what energy is. It is going to use it. All of a sudden, you’ve used up all the excess sugar in the blood. “Hey, why do you need to take this drug?”

So, now all of a sudden, as you do it more and more, you are going to start to lose weight. As you lose weight, the diabetes goes away. Now you’re turning that diabetes in reverse, right? Because you’re burning off all that sugar. Therefore, the diabetes is getting better. You’re losing weight which means that you don’t need the drug. And then you are reversing your disease.

And that is what we really want people to understand. That this is a reversible disease. And that the power to reverse it does not lie in the drugs that you give. It is a dietary disease. Therefore, you need a dietary
solution. And that means it's in your own hands. You have the power to make yourself better.

**Dr. Mowll:** And that's very exciting. So, I think there's an important distinction. Because most people think of type 2 diabetes and insulin resistance, as sort of a starvation of the cell. So, the insulin doesn't properly activate or open the channels to allow glucose to get in. So, the cell in a way is starved. But the way you describe it, it's actually an overflow. There's actually too much sugar. It's overflowing into the bloodstream.

**Dr. Fung:** Yeah. And this is what gets taught to a lot of people is this sort of starvation thing. So, this is the sort of lock and key model that insulin is like a key. The cell has a lock on it. The insulin comes in and opens the lock. The door opens. And glucose can go in. And it's almost certainly wrong. Even though that's what most people understand. Because if you think about, if the glucose can't go in and the cell is starving, this is the same situation we see in untreated type 1 diabetes where there is no insulin. That's the disease. There's no insulin. So, there's no key. Door is locked. Insulin can't go in.

Well, what do these kids look like? We don't see them anymore. Because it's been close to a hundred years that we've discovered insulin. But if you look at old pictures of untreated type 1 diabetes, they were like sticks. They were skeletally thin. Because the cell got no energy. Therefore, it just sort of shrank, shrank, and shrank. And then these kids, no matter how much they ate, they would just lose weight and then they die, right? So, insulin was a miracle drug because it allowed them to gain weight.

But now we have the type 2 diabetic, which in a lot of cases is the opposite situation. If you measure insulin levels in type 2 diabetics, they are very high. And that's why they say they have insulin resistance. But the cell, if it is starving, what do these people with type 2 diabetes look like? Are they skeletally thin? Because that's what you would expect if that lock and key model were true.

And it's like, “No, these are the people with those big bellies. They are super overweight. They are obese.” That's not a body that is starving. So, even the first look at it, you'd say, “This doesn't make any sense at all. You've got your model completely incorrect. Because there is no way that this is correct.”

And they say that because there's lots of insulin. So, remember this is like a lock and key. So, there are lots of keys. The lock is there. Why isn't the glucose going inside? There must be some kind of gum or something like that stuck in that lock? The key is in, but there is a problem, right? But that's not the only reason that glucose can't go in. What if there is so much stuff in that cell, that it's sort of bursting.

So, if you imagine, for example, you have a room, and there is a capacity of a hundred. But you actually have two hundred people because
everybody is packed in the room. You can open the door. But you can't get in. It's because people are just jammed full, right? So, there is nothing wrong with the key. There is nothing wrong with the lock. But if the inside is so full, the glucose still can't go in.

And that's what we are looking at, the situation here in type 2 diabetes is that the cell is so overfilled that the glucose can't go in. So, the solution is completely different. The solution is not to give more insulin. The solution is to empty out that cell of the glucose. And that's what intermittent fasting really does better than anything else because it allows the body to sort of clear it out.

**Dr. Mowll:** So, you're looking at getting rid of the sugar. And so, that's exercise. That's one way of doing. And fasting is really the other strategy that makes the most sense.

**Dr. Fung:** And nobody denies that exercise is good for you. That's not really controversial. So, you know, I don't generally address it because you could ask ten people and fifteen will say, “Yes, exercise is good for you.” And I agree. For sure, it is good for you. So, if you can, do it. But it is not the only way to get rid of all that glucose. You can simply not eat and allow your body, because remember your brain, your kidneys, your heart, they all need a source of energy. And if you don't eat, it is going to have to pull it from your own body. In the first place is that sugar. And then also, all that fat in the liver. It's going to pull it out.

**Dr. Mowll:** How long do we need to fast? Intermittent fasting is very popular right now. Most people are fasting 12 hours a day anyway. So, extending that to 16 to 18 hours a day. Is that enough? Do people need to be doing three, four day fast and longer to make it big difference?

**Dr. Fung:** You don't have to. Everybody responds differently. So, generally shorter, fasts are done more frequently. And there is nothing to stop people from starting with 16 going to 20, 24, that kind of thing. And then sort of moving up from there, if they need to. So, there are people who do very well with a 24 hour fast, two to three times a week. And they will reverse their diabetes with that. And it's like, “If that works for you, great.” Other people it will not.

And then maybe you need to push it a little bit more. Or you need to give it a bit more time. Or you need to watch the diet in between. Because it is a push and pull, right? Because if you are eating a lot of junk food and carbohydrates, you're putting a lot of sugar into that sugar bowl. So, even though you're letting it burn off a little bit. You are still putting a lot in. So, therefore, you have to fix the diet as well.

So, there's lots of different ways. And everybody reacts differently. So, it's important to sort of find what works for you.

**Dr. Mowll:** Dr. Jason Fung, thank you so much. You have a program. If people want to find out about that and the coaching model that you use to help people, what's the best place for them to go?
Dr. Fung: So, they can go on our website, IDMProgram.com. So, that stands for Intensive Dietary Management. So, IDMProgram.com. We offer a lot of things too. We have a free 12 week fasting course. That is just for information. And then if people find that they need more than that, they can sign up for the full course, which runs all year long. And then they can also find coaches who are going to be able to help them specifically.

So, the key is we are trying to provide education for people for fasting if they need to. If they can find all the information for free, then good for them. And also, a supportive community that is going to support them in their sort of fasting journey. Because everything is easier when you do it with a group.

Dr. Mowll: Dr. Fung, thanks so much for being here.

Dr. Fung: Okay. Thank you.
Dr. Mowll: Okay. So, I’m here with James Maskell. And we’re going to talk all about, really our broken healthcare model and how we can potentially fix that. I know you have some great ideas for that, specifically related to diabetes. But really any chronic health condition. Of course, we’re going to be talking a lot about diabetes today. So, why don’t we just start with kind of what’s wrong? You know, because I think in diabetes care, clearly, we’re doing something wrong. I mean, people are getting sicker. Lots of people are just being put on drugs. And not really getting the care that they want or need. So, you know, what do you think is wrong in the healthcare system? And then, maybe we can talk about what we can do right.

James: Yeah. So, diabetes is a great example, type 2 diabetes specifically, where the cause of the disease is not being matched by the protocol for the disease. So, if you have a disease that’s mainly born of lifestyle, there has to be a lifestyle solution to have a long term fix, right? A long term solution, a sustainable solution that doesn’t require 20, 30 years life or even lifetime use of medication. When you do use medication over extended period of time, the result is unpredictable. Because none of the drugs are tested for that amount of time. So, one pathology becomes another pathology. And suddenly you have ten diagnoses.

So, you know, type 2 diabetes is growing quickly because of the real
rapid change in lifestyle. But the medical system has not adapted to be able to provide solutions that fit the condition itself. It is really like the condition is being treated as though it was an acute disease, like an infection or trauma. And so, we have to adapt the systems to reflect the cause of the issue. And to be able to, ultimately, get to the only logical endpoint. Which is complete reversal. Where you are not on medication and you are just living a healthy life, controlling your own blood sugar with your own natural processes. And that's the goal that we're aiming for.

Dr. Mowll: Yeah, I think that's exactly right. And you know, something's wrong when everybody in the system's frustrated. Your doctors are frustrated. They don't have enough time to spend with their patients. And they know that just handing out drugs like candy isn't the answer. Patients are very frustrated. They're tired of just being told to take their medications. And getting a couple of visits with a dietitian. Even the information they're taught, most of them recognize that it's maybe not the best advice.

So, obviously the system is broken. And I think you described it really well. Kind of why that is. We are taking a chronic condition and trying to jam it into an acute care system. It just doesn't make sense. So, we need something new. Really, we need to tear it up and start over. So, hopefully we can share some of those ideas today.

James: Yeah, definitely. So, the first thing that we focused on and really for the last five years is having an appropriate operating system for care, right? What is a type of care that you could deliver where that endpoint that I just discussed is the goal, right? So, that's functional medicine. And you know, five years ago we started a show called the Functional Forum. It was really to try and get more doctors to learn about functional medicine so that they would practice it. It wasn't that easy to find out about it on the doctor side. On the patient side, it was a little bit easier. So, we've been doing that for the last few years. And the goal has been how do we get more doctors delivering functional medicine and seeing significant growth, I think. It has attracted a lot of doctors who, you know, this is kind of why they got into medical school. Why they went to medical school? Because they wanted to help people get healthy and get back to root heath.

So, the first thing is we have to have the right operating system. So, functional medicine has been around for a while. But then it's like, okay, how do we make that kind of medicine now affordable and scalable, right? So, that everyone can have access to it. And there's a couple of things. So, one of the first things that we've been big on for the last few years is pairing doctors and health coaches. Doctors and nutritionists. Doctors and dietitians, even. So, that they can spend more time with the
patients. And they go through and look at the lifestyle. Because lifestyle, you can't do it in a seven-minute office visits.

Most doctors aren't trained in that anyway. And if you have an expensive doctor doing your lifestyle recommendations, it quickly leads to unsustainable costs. And someone is going to pay for that, right? Either you, typically in functional medicine it is the individual that is paying. Sometimes a corporation, sometimes the government. But functional medicine hasn't really been super available in the system under insurance. So, it's typically meaning that people have to pay for it directly.

But then, you know, we started to see, “Okay, so now a health coach could be helpful.” It's a much lower cost practitioner. And you can see that working together. But the real access point where I feel this is going to actually scale to the masses, the use of groups. Because even in diabetes specifically, like I said, there's a Dr. David Unwin in the U.K. who's made significant steps with using groups. And the groups are super powerful in a number of ways.

One, there are a lot of causes of chronic illness, chronic inflammation, and the things that lead to type 2 diabetes, right? Food is one of them. But toxicity is one of them. But loneliness and social isolation is actually a big driver of inflammation.

And so, getting people together in a group, you know, you see the success of support groups, even things like Weight Watchers. Which is not really like a very effective clinical program. But because it's in a group, it works. And people like it. Look at the 12-step programs, these kinds of things. So, getting people who have similar kinds of issues in a group together to support each other is a really healthy starting point.

Now you infuse that with some good new science like looking at diets that can help to control blood sugar, those kinds of things. When you infuse those two things together, you have transformational results. And Dr. Unwin is a great example. But you can see at the Cleveland Clinic Center for Functional Medicine as an example.

Before you ever get to see the doctor, you have to go through a 10-week group that's run by health coaches, PAs, and not the doctor. And essentially, the goal is to educate people in a group, have them support each other. Because really the biggest thing that the group's effective for is behavior change.

Ultimately what you're talking about, if we're talking about a real solution, if behavior caused the problem, behavior change has to be the solution. And behavior change is not that easy at home by yourself. When the doctor just said, “Go change your behavior.” Because the
environment's the same, you'd been doing the same thing for a long time.

So, for those reasons and many more, I feel like groups is a great way. And it also makes it much more affordable. Because now you're splitting the cost of the practitioner between, you know, let's say between 10 and 20 people. So, now the cost per person goes down dramatically. So, now our focus on the practitioner side is to try and get these practices that we've helped build, which typically are a doctor and health coach, or a doctor and nutritionist do groups. And particularly type 2 diabetes is really well primed for this evolution.

**Dr. Mowll:** Absolutely. And you know, that's something that's actually been in diabetes management for a while. The challenge is what is taught in the groups, isn't necessarily the best information. So, what do we do in the groups? You know, we get people together in these groups. What's the purpose other than obviously supporting one another in community? That's a very important aspect of it. But what's actually being done? For example, is there, you know, meditation, are we talking about exercise and fitness? Obviously, diet and so forth.

**James:** Yeah. Look at the fundamentals of health creation. What do you have to do every day to be a healthy human? You know, there's this big gap at the moment between health creation and disease management. And any group that's created with the energy of the disease management is like not really taking best advantage of what the power of the group is for. The power of the group is really there to facilitate transformation of behavior.

So, that will be food. That's a big thing. So, you could talk about food. You can talk about how to create healthy food. Some of the most innovative groups are actually getting groups of people to cook together. Because typically learning to cook is a big issue. It's a big thing that has to happen for people to be able to change what they're eating. If they are still eating out the whole time, it's not easy to be healthy. So, that is the first thing, food.

But then you see, like what are the other fundamentals? So, the relaxation response, stress. So, meditation, teaching people how to do that in a group structure. Having people be accountable to each other.

With regard to the food, my mother-in-law about five years lost 110-pounds. And the only thing that changed, is that she had to call someone at the end of the day to tell them what she'd eaten that day. No money changed hands. It was kind of like overeaters anonymous or something like that.

So, no money changed hands. There was a mentor and a mentee. But
just that, you know, one call, every day or the threat of that call every
day. Like her behavior changed because she didn't want to have to call
that guy and say, “Hey, I stopped at McDonald's. I messed up. I drank the
Big Gulp, right?

So, that's an incredibly efficient process. So, you know, peer to peer
accountability in those groups. I said meditation. But you know, exercise.
Anything that is healthy in an individual way. Like exercise is healthy
as a group. Walking clubs, running clubs. I don't know if you ever say
the videos of people in China, where they are doing Tai Chi together or
they are all doing Chi Gong. Like finding ways for people to exercise, be
together, and community.

So, any healthy behavior that you've ever been prescribed. If you try and
do it as part of a group, it sticks for longer. You stick with it. And you
have a supportive community who help you maintain the behaviors.

**Dr. Mowll:** Now, is this something, it sounds to me the way you describe
it. That this is best done in person. You know, where you have a group of
people in a room supporting one another, interacting with one another.
Is there a way to translate that to an online forum? Zoom calls and
things like that? Is it going to work? Is it effective? Or do you really need
to be in the same place at the same time?

**James:** I think there's green shoots to say that it might be possible,
right? There are examples that I've seen in the functional medicine space
where information delivery plus online support has changed behavior.
And that's exciting because ultimately that means you're increasing
access significantly. If you always have to do a group and you have to
drive to an office once a month or once a week even, for a period of time
that can lead to a reduction in the amount of access that you can have.

We’re just at the beginning of this. I think that there's enough to show
that it can be possible. You know, I've seen things happening even in
like your Facebook group, for example. People supporting each other as
they start making changes. And saying, “Hey, I'm wondering about this,
can you help?” and five people jump in to say, “This is my experience.
This is what I found.”

One of the most powerful things that we found with our groups, Brian,
is that the person that's been through the process of actually reversing
their diabetes, in this case. If they've actually done that, they're much
more credible to the other people in the group than the physician.

Even if the physician has had an incredible experience of diabetes
themselves. Hearing from someone else, this is possible. I did it. This is
what I did. It has a transformational effect, it's inspirational, but it also
gives a sense of like, “I can do this and stick in for the long term.” So,
what we’ve seen is the most effective groups have a combination of people at different stages of the process.

But there are early signs that you can do Zoom groups. Some of the things that we've been actually playing with in our practice accelerate group, which is a group of practitioners doing functional medicine, trying to build more scalable models. It's a hybrid model. Where in the first appointment, everyone comes together and really shares their purpose. Why am I doing this right? The first thing to do is share purpose because if people hear your purpose and you know what you're going through. It's like an empathy machine.

But then after that to be able to use Zoom ongoing, an online portal, so that you get the benefit of the in-person and then you can continue the relationship. And we've been trying that out. We should have some results by later this year to see how it affected.

But ultimately, I think the goal is, how do you introduce people who want to be healthy to each other? And then how do you kind of like get out the way, in a certain way, so these people can maybe just be friends, right? For a longer, extended period of time? Because that means that’s like diabetes prevention, never mind just reversal.

Dr. Mowll: Absolutely. And you are completely correct that loneliness, isolation is a big part of diabetes. It's huge. You know, people become shameful about developing diabetes. They don't want to tell other people about it. They don't feel safe necessarily with their old friends, their family members. And to have a community of people going through the same thing, in much the same way, you can be completely incredibly valuable.

James: Absolutely. Yeah, I'm excited to see where it's going. We were just at the beginning parts of it. But there's enough examples already, that it's working. And so, now it's just on the medical establishment to take it on. But I would say for people who are watching this, who you know, who are frustrated, maybe there isn't a group in their area. Starting a group is not that hard, right? Taking action to build a group. There are so many tools now like Eventbrite, Facebook, and Meetup. Like if you started your local type 2 diabetes reversal with a low carb diet group, people would show up. People would want to be part of it.

And the benefit of a group, you know, there's a lot of benefit to starting that kind of community. So, we all have the tools at our disposal to do it. There's enough content out there. All the stuff that you've made over time with the Diabetes Summit and so forth. But there's a lot of great information out there. And you know, I think that it's the barriers to entry to actually take action and start doing it, are not that hard. And you can use online tools to create offline connections.
Dr. Mowll: You wrote a great book called, *Evolution of Medicine*. And that's kind of what we're talking about right now, is evolving medicine, the way medicine is practiced. And I think for diabetes that really needs to happen. You have mentioned some great examples already. But how do you think this is going to happen? How do you think medicine is going to shift or evolve to be able to handle these chronic conditions over time?

James: The kind of good news/bad news is that something has to change. Because we're running out of money, right? And putting people on drugs for extended periods of their lives is leading to unsustainable costs. So, in different countries, I think it's going to work out differently depending on how the medical system is set up, right?

So, in the U.K., we are really starting to see that there are doctors there, Dr. Unwin's, Dr. Aseem Malhotra, has been going crazy talking about we have to have a fundamental shift in how we are teaching people to eat. And the diabetes groups, all those kinds of things because he's passionate about the transformation. So, there has to be more systemic change there because the government's running everything. Whereas here there's more opportunity for innovation. Because it is a kind of market-based system in a certain way.

So, we're starting to see shoots. If you look at the macrocosm in medicine. Payments are shifting from like fee for service to fee for value. So, you are going to get paid not for doing stuff, but for keeping people healthy. And so, when those incentives shift, we'll start to see more and more innovation happening in trying to build these kinds of groups. Because if these groups are really successful at keeping people healthy. Then that's what we need, right? We need structures that help facilitate the health of groups at a time. So, I'm excited to see the macrocosm, you know, the rules are changing, and that will incentivize the creation of exactly what we're talking about.

Dr. Mowll: Yeah. The other big point of frustration for people oftentimes is their insurance. You know, because the insurance doesn't seem to be covering the things that they want or feel like is best for their health many times? And again, that is part of the broken system. So, I know you have a company called Knew Health that you are trying to make some changes with this.

James: Yeah. Look it's the same concept all the way through, right? It's the same concept. Which is can we create a community of people that are incentivized to help each other get well and stay well? And that's really the vision for Knew Health. There's an interesting history in America of an alternative to insurance called cost sharing, medical cost sharing. It's been around since the 80s. It's grown significantly.
But it’s always been a Christian thing, right? Churches splitting out of insurance, taking the risk on the community. Like the community spreading the risk of you being hit by a car or whatever. Rather than using a company, like an insurance company, to reduce that risk. And it’s been very effective. It’s been way cheaper than health insurance. And it plays a very similar function.

And ultimately, I personally, when I had my daughter, I never had insurance when I lived in America. For seven years, I didn’t have health insurance. Because I was just starting my business. I couldn’t afford it. The first company that I worked with didn't give me health insurance. So, I was kind of like taking a real risk. When I had a daughter, my mother-in-law was like, “You’ve got to sort it out, right? You can’t just be freestyling anymore.” So, that’s when I found the Christian ministries because they had an exemption to Obama Care. And so, I would have been paying $1,800 a month for my health insurance. And now I am paying $449 a month. So, saving $1,300 a month or $16,000 a year.

Now, I could now use that to pay my functional medicine doctor or to pay the pediatrician that I liked that didn't take insurance. And so, I just started to think, okay, this is actually, you know, if you are into wellness, if you want to see a doctor that understands what we’re talking about. Why not reduce the amount of money that you’re spending on just taking care of like the downside risk of being an accident, which is kind of the similar on both. Because in insurance, you are really paying for all of those drugs. You’re paying for the Metformin ahead of time because one in three people is going to be on Metformin. So, they have to take the price of the Metformin for life and divided amongst everyone.

So, we started Knew Health as the first non-Christian medical cost sharing group, open to all denominations. Ultimately, the people that come in, share the same principle. Which is they believe in health creation. They take care of their own health. They invest in their own health. And we are right at the beginning of the process. We have hundreds of members now. We will be growing it later this year.

But ultimately, what we see is that at one end, we've got this alternative to insurance that is cheaper. On the other end, we have this growing group of functional medicine practitioners. Our goal, in the few years, they sort of merge into one health creation, disease prevention system that almost anyone can buy into and be part of.

Dr. Mowll: Sounds exciting. James Maskell, thank you so much for being here with me and sharing some really incredible and practical information.

James: Thanks, Brian. I appreciate it.
**Dr. Mowll:** If people want to find out more about you or what you’re doing. What’s the best place for them to go?

**James:** So, the health insurance alternative is Knew Health. And that is where you can find out about that. And for doctors and practitioners, *The Evolution of Medicine*, you can just Google that. There is a book and a community of doctors that are all working together to build the new healthy system.

**Dr. Mowll:** Perfect. James, thank you.
Dr. Mowll: So, I'm here with Dr. Jake Kushner, who is a pediatric endocrinologist. And we're going to be talking today about type 1 diabetes. And again, using more of a low carb eating approach for type 1. I think this is a very important area. And we talk, of course, a great deal about type 2, a lot of people watching this have type 1 diabetes. And, you know, they are looking for some good information as well.

So, let's talk about this. And I guess, my first question is low carb diet is not necessarily the first approach. The primary approach for someone who's newly diagnosed with type 1, maybe why? You know, you think that might be and what the value of using a low carb diet would be?

Dr. Kushner: Well, just briefly on type 1. So, type 1 is the most common, life threatening, medication requiring, chronic illness of childhood. And there's a million and a half people in the U.S. with type 1. And ten million people worldwide or more with type 1 diabetes. And they're typically diagnosed as children. Some are diagnosed as adults. And they receive care in centers that have a comprehensive support, many of them including dietitians, et cetera. And the traditional way of treating and supporting type 1 diabetes has been with very precise amounts of carbohydrates.

And so, families when they're diagnosed, we'll be given these handouts. These sheets that describe quite precisely the number of grams of carbohydrates their children or themselves should consume. It's typically 45 to 55% of their calories from carbohydrates. And the problem with
that is when you begin to replace back the insulin. And at its core, the problem with type 1 diabetes is these people are missing the ability to make insulin.

Early on, they make a little bit. After a lifetime of type 1 diabetes, they make almost none at all. And so, there are mostly, or almost entirely dependent upon injected insulin to stay alive. And the problem is figuring out the amount of insulin for the carbohydrates in the meal is incredibly difficult. And so, most people I know don't walk around with gram scales in their pockets or measuring cups in their purses. Though I've seen people with type 1 diabetes do these things. And even when you go to that level of extreme, it's still very easy to make mistakes. And so, if you eat a large carb meal and you think you know how much insulin that requires, afterwards, a couple of hours later, it's easy to have your blood sugars be up to 500 milligrams per deciliter or as low as 50. And that lends itself to feelings of frustration, fear, and disappointment. And frankly, just disrupts your life.

And so, it becomes really challenging to live with type 1. Simply because the standard insulin to carb ratios are nowhere near as precise as they are claimed to be by most medical professionals. And my own journey around this, basically, came as a result of meeting people who live with type 1. Learning from them, what they had learned to try to stay healthy and stay alive. And also, using continuous glucose monitoring in my practice. And learning from my friends who had type 1 diabetes. And watching their continuous glucose monitor data strips. And ultimately, I just came to the conclusion that a lot of carbohydrates was really complicated and dangerous for people with type 1. And then the question goes, what else do you eat? And so, I ran across the, the book by Dr. Richard Bernstein, which is, *The Bernstein Diabetes Solution*, which I just love. It's a great book. And I began to meet other people who were interested in this topic as well. And through my own practice, I essentially changed the way I practiced focusing on reducing carbohydrates. And I've just found that it has utterly transformative results.

**Dr. Mowll:** What you described is that when people are diagnosed with type 1, they're taught to monitor the amount of carbohydrates. They're given a very specific recommendation. Whether they're using an insulin pump or injections, they are trying to match the amount of insulin they are taking with what they are eating. And it becomes very difficult. Dr. Bernstein calls this the law of small numbers. Where the more carbohydrates you eat, the more variables you're throwing into the mix. It becomes much more difficult because insulin, technology, and continuous glucose monitoring has grown. It's gotten better. But it's hard to mimic exactly what the pancreas does.

**Dr. Kushner:** Yeah. Again, I've been counseled by many people who live with type 1. And over and over again, they find that when they pay
attention to their glucoses, they discover that fewer carbs means less deviation from normal. And my friend R.D. Dikeman, who started a Facebook group called Type 1 Grit, is also a rocket engineer. And he told me that he made the observation when his son was diagnosed. That when a rocket is flying up and it gets off course.

Of course, what you end up having to do is use a ton of fuel to get it back onto its course. And if you're a rocket engineer, that's a really bad idea. So, what you are trying to do is minimize variation. So, that you can hit the target. And the same is ultimately true in diabetes. I think a lot of people who live with type 1 diabetes are almost unaware of the daily ups and downs that occur. Because they don't see any other way to reduce that variation, that flux, that noise in the system. And once you become aware of the flux, of the noise, and you realize that it's something you want to try to reduce. Then low carb becomes the breadcrumbs out of the forest.

Dr. Mowll: One thing I've learned from working with people with type 1 diabetes is just how many things influence blood sugar. And it becomes really an incredible slate to see. And you have tight control of your blood sugar, especially if you are following a low carbohydrate diet. It's a great way to evaluate how stress, for example, sleep, and other factors affect it. So, could you maybe talk about some of those other factors? And how we can try to control those as well?

Dr. Kushner: So, exercise is a really big deal. And as people learn to the value of exercise and type 1 diabetes. As they exercise regularly, they'll see that their blood sugars smooth out. And that's from a really unique pathway. There’s an insulin independent glucose uptake in skeletal muscle. And so, after exercise, many people with type 1 diabetes will realize that their blood sugars go low. And what's happening is you're actually tricking your skeletal muscle and are just sucking up glucose. So, it's like a sponge. And if you can build up aerobic exercise into your life on a daily basis. Oftentimes you can reduce the total amount of insulin you require. And also, reduce the amount of bouncing around and flux. To the point where they are marathon runners who require far less insulin than you’d imagine. And have very smooth blood sugars.

So, exercise is a big thing. But also, stress. And so, if you’re excited, stressed, or under a lot of pressure. Or even if you’re exercising and like for instance, a very intense sport like basketball, you may see your blood sugars go up early on from that adrenaline. And so, finding ways to anticipate those rises is a good idea.

And also, finding ways to calm your mind. And be able to try and minimize the amount of daily stress. Sleep is also a big deal. Sleep is enormous. And people with type 1 diabetes often describe that their blood sugars are kind of zany and out of whack on the days that they don't get a lot of sleep. So, that's not easy to do. But finding ways to track your sleep, make sure you turn off devices early in the night, and
you are giving yourself time to rest. It’s a big deal.

I think, ultimately, it’s really about putting together, like a support team. Because it’s easy to say, I want to do all these things. It’s very hard to actually do them. And so, finding other people who were similarly impacted who have type 1. Learning from them.

And then also, giving back to the community and helping others can make an enormous difference. And what you’re trying to do when you do that is to be more aware of your process, the journey of learning around type 1 diabetes. And that kind of diabetes mindfulness can be enormously helpful. And realistically, if you try to do this alone. It’s very lonely. It’s challenging. So, you need support.

**Dr. Mowll:** People get isolated with diabetes. And I found this equally as true with type 2. There’s a shame factor. And people tend to withdraw from friendships and other things. And if they’re not getting the support from their doctor and healthcare team, they’re not congruent with maybe their goals or desires, what they want. It can be very lonely.

**Dr. Kushner:** Yeah. And that is what we all diabetes distress. Where your aware of living with diabetes and it’s interrupting your ability to think about other things. So, I often ask people to actually be mindful of how they feel. And what are they thinking about right now?

And so, I will often ask people in my practice, “Tell me about diabetes distress? Tell me about how you think about your diabetes?” I even use a Likert scale, where I will say, “I want to describe diabetes distress on like a one to ten scale. Where ten means you’re thinking about diabetes all the time.

And you can barely think about anything else. And a one means you know you have diabetes. But you don’t think about it at all.” And then I say, “So, if it’s a one to ten scale, where are you right now?” And quite often people will look at me and then you can just see the blood drain from their face. Because no one has ever asked them. And when they begin to answer, they will ashamedly say, “A seven.” And I’ve seen people start to cry. I mean, it’s very stressful.

The stress of living with diabetes is immense, whether it’s type 1 or type 2. But talking about it is a way to be able to go on the journey to ultimately reduce that stress, to reduce the cognitive burden of thinking about diabetes, and find a way to live life and to love it.

**Dr. Mowll:** Yeah, very well put. Totally agree. You mentioned, Type 1 Grit, and there are other groups like that on Facebook and other places, that I think are so valuable. Because it does give you that community.

**Dr. Kushner:** Yeah. So, one I’m really fond of is CDN, for the College Diabetes Network. Full disclosure, I served on the board of CDN for three years. They have 180 chapters around the U.S. And these are chapters in colleges and universities. And these are comprised people who live with diabetes who are college students. And they’re there to
support each other. And finding that kind of community is a really big deal.

So, for people who are interested in meeting others, there’s also a meetup groups for adults with either type 1 or type 2 diabetes. And you could also even volunteer at your local diabetes camp. I think many people, probably 95% of the audience of this video, would realize that they’re within an hour or two of a diabetes camp. And they could go volunteer in the summertime. So, again, it’s about building community. If you volunteer at diabetes camp, you would ultimately find that there are many people including your own age, who are facing the same condition, who want to learn.

Dr. Mowll: Great. Just to finish up. In your experience and expertise, people with type 1 diabetes, this is a lifelong disease they’re going to live with. If they achieve good blood sugar control with a low carbohydrate diet, good lifestyle factors. What’s the outlook look like?

Dr. Kushner: The outlook can be amazing. People can live incredibly long and full lives. And so, I have many close friends who have had type 1 diabetes now for more than five decades.

And so, for instance, my friend Jimmy Goldman, and my friend David Boils, these are both guys who I know from Texas, who were diagnosed when they were teens or children. And they’ve now had diabetes for more than 50 years. And they still live life incredibly full.

And so, it is possible to live an amazing life with type 1 diabetes. And we haven’t put enough attention on those wonderful examples. If I could give anything to the diabetes community, it is that we could tap into that collective knowledge and wisdom and pass it down to the next generation. Because it is possible to live a great life.

Dr. Mowll: Dr. Jake Kushner, thank you so much for being here. If people want to maybe follow you or find out more about your work, what’s the best way to do that?

Dr. Kushner: Well, I’m on Twitter. So, it’s JakeKushnerMD, all one word. And I’m also on LinkedIn.

Dr. Mowll: Thank you, sir.

Dr. Kushner: Appreciate it.
Dr. Mowll: All right, so I'm here with Dr. Jack Wolfson, the Paleo cardiologist. So, Dr. Wolfson, welcome. Excited to have you here. And I'd love to ask you about, since your specialty is cardiology, I'd love to ask you about the connection between type 2 diabetes and vascular health. Most people are aware that one of the main co-morbidities with diabetes, one of the main complications of diabetes is heart attack, stroke, and other vascular problems. What is the connection there? Why is it so strong?

Dr. Wolfson: Well, I think that there is a lot of factors that lead people to develop type 2 diabetes. There's a lot of factors that lead people to develop cardiovascular disease. And a lot of those factors are similar. So if we talk about nutrition and lifestyle, they can lead to diabetes. They can lead to coronary artery disease. But I think pretty much in my experience, everybody with coronary artery disease has some amount of insulin resistance or officially type 2 diabetes, or elevated blood sugar.

One of the things that I often speak on is that diabetes really is just a label. It's a label for someone who's blood sugar meets a certain criteria. But what about just before that? Just before that maybe we'd label them as pre-diabetic. But those people, for every bit of blood sugar elevation that you get, so does your cardiac risk.

Dr. Mowll: So what's the connection between insulin resistance then
and vascular problems or heart problems?

**Dr. Wolfson:** Well, I think that the elevated blood sugar, in and of itself, leads to toxicity of blood vessels, it damages blood vessel proteins, leads to blood vessel dysfunction, and then eventually to coronary artery disease.

But the concept of insulin resistance where two things happen, the body is not making insulin enough, number one, and then number two, the insulin it makes, the cells of the body are not responsive to it. That leads to all different types of factors. And that could be inflammation. That could be oxidative stress. That could be lipid abnormalities, as well. So abnormal levels of LDLs and HDLs that are all so important when it comes to cardiovascular risks.

So we really have to take a very important proactive approach to make sure that we get rid of insulin resistance, and therefore, we're going to do our best to prevent coronary artery disease.

**Dr. Mowll:** Yeah, so a lot of people who have diabetes are put on statin medications, whether they have high cholesterol or not because they're considered at risk, right. So what's the connection between diet, first of all, and lipids? And then what's the connection between using statin medications or other ways to lower cholesterol and triglycerides? And how does all that relate to diabetes?

**Dr. Wolfson:** Sure. Unfortunately, where we are right now in society is that the medical doctors think that we're deficient in these pharmaceuticals. They think that coronary artery disease is a statin-drug deficiency.

And it's just how we're trained and where our mindset is right now. But if we continue to trace it back, and we can see that eating the right diet will lead to the best lipids, cholesterol, and LDLs, and HDLs, and triglycerides, eating the best diet will also lead to the best blood sugars.

So if we follow the right diet, which I am the Paleo cardiologist, I'm a big Paleo believer, if you will, but to me, Paleo is the nutrition of our ancestors. Our ancestors ate a certain way for millions of years. And we should eat that way, as well. And if we look at things that elevate blood sugar, it's very clear that sugar elevates blood sugar, carbohydrates can elevate blood sugar, and fats don't.

So I tend to be more on the low-carb, higher-fat side than anything else and still enjoying those Paleo foods, and eating lots of vegetables, eating nuts and seeds, and eggs, and avocados, and coconuts, and free-range grass-feed meats, wild seafood. And I think that's how we get our best results, not only for coronary artery disease prevention, cholesterol
reduction, and also for improvement of blood sugar and getting rid of insulin resistance.

**Dr. Mowll:** Yeah, that makes a lot of sense. So a lot of people watching this are probably thinking, “Wait a minute, don't fats raise lipids, though, you know because my doctor told me I should eat less fat or certainly less saturated fat?” So what's the connection between dietary fats and the lipids in the blood that we measure on blood tests?

**Dr. Wolfson:** The literature is clear from large meta-analysis studies, including hundreds of thousands of people, that fat intake is not linked to coronary artery disease. Cholesterol intake from food is not linked to coronary artery disease. In fact, saturated fat intake can actually improve the cholesterol profile because saturated fat has been proven to increase LDL.

So I think that, although, if you look at fat intake, you may find higher total cholesterol. Total cholesterol is not a very good marker of cardiovascular risk. What really matters now in the 21st Century is that ratio of LDL to HDL. And what we find is that the lower that ratio, meaning high HDL, lower LDL, the lower our risk is going to be. But oftentimes, when you do take in fat, total cholesterol goes up, LDL goes up, but HDL goes up. So the ratio is preserved.

I guess, in short, I'm saying that it's not a fat problem. Everybody knows that the healthiest people in the world, they live in the Mediterranean. And they're sucking down olive oil all day long. And they're tremendously healthy. And olive oil has a very large component to saturated fats. Tribes in the South Pacific, people in the South Pacific, 50% of their diet is based on coconuts. And that is often been vilified as a source of saturated fat. Yet, these people in the South Pacific live very well, and very healthy, and very low risk of chronic disease like insulin resistance and type 2 diabetes.

**Dr. Mowll:** Where do triglycerides fit in because I've noticed with my patients and clients that when they go on a low-carb diet and a higher-fat diet, their triglycerides come way down? And that's a sign that I look for when I check for people with insulin resistance because when they're insulin resistance and the insulin levels are high, typically their triglyceride levels go up, too. So how do those fit in with cardiovascular risks?

**Dr. Wolfson:** Well, triglycerides are a very important marker. I think they are. Just like you said, they're very important when you're talking about this whole metabolic syndrome of which insulin resistance fits into an elevated blood sugar and, of course, abnormal lipids, including high triglycerides. But the risk of elevated triglycerides essentially for every point you go up on triglycerides, so does your cardiovascular risk. It's like
a perfect linear line, as opposed to other markers where you’re looking at total cholesterol, which is not really a good predictor.

Total LDL concentration is not a good predictor either. But certainly, measuring triglycerides are. And I would certainly agree that the people that have lower carb intake and certainly lower sugar intake have much lower levels of triglycerides. So I think that’s definitely a fantastic measure to look at people's risks.

**Dr. Mowll:** So you are known as the Paleo cardiologist. And I think most people have heard of Paleo, but there’s a lot of confusion right now between Paleo, and Primal, and Keto, and low carb, and these different types of eating that are under a similar umbrella. So what exactly is Paleo? How do you look at the Paleo diet in a nutshell, so to speak?

**Dr. Wolfson:** Well, first of all, what I would like to say that is anybody who listens is that no matter what diet you’re on, no matter what nutrition plan you’re following, make it organic because when you eat organic food, you’re not going to have the pesticides, you’re not going to have the artificial ingredients, you’re not going to have the chemicals in the food.

So I think that no matter what plan you follow, let’s at least get the chemicals out of it. So therefore, if you do enjoy an occasional ice cream or dark chocolate or whatever, just make it organic because you get everything that you love without all of the chemicals and toxins. But fundamentally, Paleo means Old Stone Age or Prehistoric. And it is following the wisdom of Mother Nature, of evolution, of our Hunter Gatherer ancestors and trying to bring that into the 21st Century as a nutrition plan.

And when people say, “Well, Paleo is just another fad,” well, to me, everything else is a fad besides by Paleo. By definition, Paleo, once again is prehistoric. Now, Paleo can mean different things to different people, depending on where you are on planet Earth. But when it comes to Paleo, it can be a low-carb Paleo, it could be a higher-carb Paleo. And I think that for optimal health, it probably is more towards the lower-carb Paleo side is where I chose to practice.

A lot of people now talk about Keto. I guess maybe some of the differences between Keto and Paleo is that Keto would allow for dairy and Paleo would discourage it. My personal opinion regarding dairy is that if you do occasional raw dairy, that that is allowable, but it shouldn’t be a major part of your diet like it is for a lot of the Keto folks.

**Dr. Mowll:** So in addition to a good diet, there’s some other foundations that we want for a good healthy lifestyle so things like rest, of course, and sunlight, and exercise, and fitness. One thing I wanted to ask you
about is supplements. How do you feel about nutritional supplements and are there maybe a few key things that people should be considering when they look at their supplements?

**Dr. Wolfson:** Well, I'm certainly a big fan of supplementation that supplements the healthy lifestyle. So you cannot take a poor nutrition plan, and a poor lifestyle, and think you're going to do well from a multivitamin. It's all part of the plan. And the supplements are supposed to really replace the missing nutrients that we're just not able to get from our diet.

We don't have the ability to be true Hunter Gatherers these days. So therefore, the food, because of the soil, because of the water, because of the air, may not be as quality as it used to be. So that's where supplements can come in. I personally, think that everybody should be on a quality multivitamin. I think everybody should take probiotics. I think everybody should take a greens powder, for example, for breakfast to really start off the day on the right foot with a nice organic greens powder product.

And I think, once again, as far as how to choose the best quality products, I think you have to go with people that you trust, people that you know have done the research, and you have to go with quality. So if I say everybody should take a multivitamin, this is not Dr. Jack Wolfson saying go to the corner drugstore and get a men's One-A-Day. That's not going to work. That's not going to work for what you need. And you've got to take quality products.

**Dr. Mowll:** So what should people look for if they're looking for a good multivitamin?

**Dr. Wolfson:** Well, I think a good quality multivitamin, first of all, when you read the other ingredients, make sure that the other ingredients are pretty minimum. Make sure that there's no artificial colors, artificial sweeteners, artificial flavors that are in there. Looking typically for names you can't pronounce would be something that is also you want to avoid.

Another thing that I use to look for quality supplements, when it comes to a multivitamin, is looking at the form of the B vitamins. So are they methylated B vitamins or not? So therefore, it doesn't contact a folic acid, it contains methyl folate. It doesn't contain cyanocobalamin as B12, it contains methyl cobalamin. I think that's a good place to really understand that you are taking a supplement whose manufacturer, who's formulator really is up to date with cutting-edge science regarding supplementation.

**Dr. Mowll:** How do feel about fish oil, fish oil capsules, in particular, or
liquid fish oil, fish oil supplementation? Because there has been some controversy regarding some studies showing positive benefits and some showing little to no benefit for cardiovascular health. Where do you fall with that? And do you think their worth taking?

Dr. Wolfson: Certainly, I'm a big fan of eating fish. That's a large part of the Paleo diet. And I usually tell my patients, five to seven servings of fish on a weekly basis is where you should be. Wild salmon, sardine, anchovy, shellfish, all those things are absolutely fantastic. And the literature is very clear that the people that eat the most amount of seafood, seem to have the lowest risk of everything. And that's, quite simply, it's Paleolithic foods. Our ancestors ate a lot of seafood and so should we.

When it comes to fish oil supplementation, I think that there is certainly value to it when you take a high-quality product, once again, quality really counts. When it comes to fish oil, for example, if it comes in a bottle, it can become rancid very quickly. How it’s processed, where the fish came from, the transport time, how long it's been in that bottle, all those things can lead to an oil actually becoming somewhat inflammatory.

Now, I'm not aware of any data that says that omega-3 fish oil is dangerous, but as far as efficacy and benefit, I think, once again, it's there to supplement someone who may be doesn't eat a lot of fish, refuses to eat a lot of fish, or maybe because they've got such high inflammation, they need to take the fish oil.

I'm also a big fan of measuring intracellular omega-3 levels. So you can actually ask your doctor to get your level tested and make sure that you are in a higher percentage basis of omega-3s because the people with the highest omega-3 percentage have the lowest risk of just about everything.

And then finally, that omega-3 oil is sitting in the cell membrane. And the way the cell membrane communicates with other cells—the same cell membrane, it keeps things inside the cell that belong, things outside of the cell that don't belong—and the way that that cell fence or membrane communicates with other cells and hormones, and the outside world had a lot to do with the omega-3 content of that cell membrane. So load up on your seafood and do not be afraid to use omega-3 supplements.

Dr. Mowll: Dr. Jack Wolfson, the Paleo Cardiologist, thanks so much for being here with me today. If people want to find out more about you and your work, what’s the best place for them to go?

Dr. Wolfson: The best place is come over to our website, TheDrsWolfson.com. Doctors is abbreviated Drs. And we've got fantastic
information there. And then, of course, my Amazon bestselling book, *The Paleo Cardiologist: The Natural Way to Heart Health*. And I think, once again, I appreciate all the work that you're doing, and getting the truth out there, and really educating the masses that I know you're passionate about that we can do this naturally. And there's a way to do it. And we get people a lot of good answers. So thank you.

**Dr. Mowll:** Well, thank you, for those kind works. And thanks for being here today.
Dr. Mowll: All right. So I’m here with Ivor Cummins who we’re going to talk to today about cardiovascular disease, heart mortality, especially related to diabetes. And, you know, there’s this correlation with insulin. In fact, I found the late, great Dr. Kraft through you, who described these insulin assay patterns that he spent really most of his life researching, which was just an incredible contribution. And we know that people with hypeinsulinemia and insulin resistance tend to have inflammatory issues, which can lead to cardiovascular problems and so forth. So I’d love for you to talk maybe a little bit about that connection between insulin and vascular disease, and kind of how all this fits together with diabetes.

Ivor: Right, Brian. Well, I suppose you could start with insulin connection to cardiovascular disease and the association type studies. We have everything from ravens landmark study in 2001, where people who had a high steady state plasma glucose, SSPG, which is kind of an extraordinarily accurate measure of your insulin resistance, they had a 40 times multiplier of risk for future events, and an associational study with middle aged people.

So that obviously sounds very high. But then there are other studies where repeat heart attacks in Colombian man tracked over seven years, having a higher insulin and insulin resistance was a seven times multiplier of the chance of a second cardiac event.
So we've got all of these associational studies where there are huge risk multipliers for being high in insulin relative to, say, cholesterol, where it might be a 1.5 multiplier to have a poor cholesterol profile. But essentially, insulin resistance and hyperinsulinemia, it’s important that we see that they occur together for it to be pathological.

So one caveat I always point out is, if you’re on a low carb diet with very low insulin levels, low glucose levels in your blood, very healthy, you may actually have a physiological insulin resistance from a long period of eating very little carbohydrates. And if you take a oral glucose test, your glucose may shoot up, because your insulin actually is very low and not ready for the oral glucose.

Yeah, so that's insulin resistance in the absence of hyperinsulinemia. So we always say hyperinsulinemia and insulin resistance in your body, together, is the challenging environment for cardiac disease and many other modern chronic diseases.

So there are many mechanisms; high insulin causes incorporation of lipids in the arterial wall. High insulin causes fats to gather in your liver and in your organs. And that ectopic fat, in turn, causes functionality problems in your organs, and then higher blood glucose and higher free fatty acids. So insulin resistance and hyperinsulin, as well as causing problems in your body, they also act as an excellent gauge that something else is wrong in your body.

So if you have high insulin or insulin resistance, something is very wrong. It's not just that the insulin being high as driving issues in your arteries. It reflects a really bad scenario. And it may be that you have an infectious problem, your insulin and your insulin resistance will rise accordingly. You could have oxidized lipoproteins, or you may be oxidizing your LDL particles, and that will trigger immune reaction, and your insulin and insulin resistance will rise.

If you're smoking and damaging your physiology, insulin and insulin resistance will rise. If you are very sedentary; overly sedentary, insulin and insulin resistance will rise with time. If you eat too much sugar and carbohydrates, or vegetable seed oils that will predispose over time to your insulin and insulin resistance rising.

So I think it's very useful people to realize insulin and insulin resistance are an excellent gauge of many, many different things that can be wrong, including sleep deprivation has been proven to rise insulin and insulin resistance. So in a way, it's a perfect gauge for something under the hole that’s very wrong. That in turn, that thing will be driving heart disease through many different pathways.

Dr. Mowll: That's fascinating. So you talked about insulin and insulin
resistance together being really pathogenic for cardiovascular disease and a number of other things. And then you just described many of the things that elevate insulin and cause to be insulin resistant. I noticed one thing, you didn't say, is too much fat in the diet. And that's what we hear sometimes from plant based community that, you know, it's too many fatty acids in the blood from too much fat in the diet that causes insulin resistance.

Ivor: Yeah, I've heard that one before too. It's highly misleading. So too much fat in the diet combined with too much refined carbs as a combo, by all means, is a really bad combination. I mean, a donut is the classic example. But if you take away the refined carbs and sugars, and you have high fat in the diet, in the absence of much carbohydrate, that's a completely different technical scenario. And we have these scenarios and engineering too, where things can have very high dependency. This is one of them, so high healthy, saturated fat and fats is only healthy in the absence of refined carbohydrates, and excessive carbohydrate.

So I always quote Professor Volek excellence study, where he got two groups of people who were overweight with metabolic syndrome. So the perfect people to show up what a bad diet might look like. And they put half of them on a healthy high carb diet, food pyramid; healthy diet not sweets and Coca Cola, really healthy.

And they had a very low saturated fat and fat in the diet. They then took the other group and gave them three times the saturated fat and a very high fat keto diet with low carb. And that second group maxed out on good blood in the following weeks. They had dramatically better blood markers than the guys on the standard diet. And even though they were eating three times the saturated fat, I think it was 36 grams a day, was a lot.

Their blood fat levels were much better than the people on the healthy government diet. They had lower blood fats. So it seems counterintuitive, but the high fat in the presence of the low carb allows your body to become an excellent fat burner. And you end up with lower blood fat, lower insulin, lower blood glucose, higher Adiponectin, lower leptin, lower inflammatory markers.

I mean, Volek measures at all. And he showed a profile of excellent lowering of inflammatory markers, and everything that matters; HDL went up, LDL actually stayed around the same. So it's an important concept to know that higher healthy fat diets are only healthy if you don't swallow them down with carbohydrates, especially refined carbohydrates or sugars.

Dr. Mowll: Yeah, great explanation of that. So you talked about how insulin is associated with a lot of cardiovascular problems; high insulin,
I should say elevated insulin levels in the blood, hyperinsulinemia. Yet doctors really seldom measure insulin and almost always measure cholesterol, LDL, total cholesterol and so forth as standard cholesterol profile. Can you talk about this idea of measuring insulin and why it’s so important?

**Ivor:** Well, insulin, as I mentioned, is an excellent gauge. Now the fasting insulin is not so representative, shall we say the test can accurately find it. But many people with very high post meal insulin levels, postprandial so an hour after a meal might have huge insulin, because they are essentially diabetic profoundly. Often the fasting insulin for those guys can look okay, so their body is capable of keeping the system under control, you know, 12 hours after eating things have leveled off.

So fasting insulin is not such a great measure. If you measure fasting insulin and glucose together, there's a HOMA, a HOMA calculation. That gives you a fair indication of how insulin resistant you are. Ideally, you’d take 75 grams of glucose solution, drink an oral glucose drink, and two hours later get insulin, that's your postprandial 2 hour insulin.

Now, if that’s below 30, or almost certainly going to get a good craft curve, you're insulinnemic, you're non diabetic. And if you're above 40 very likely you're essentially diabetic. So that 2 hour post drinking glucose- insulin is much more accurate, because as I sometimes say, it's measuring the jet engine at operating conditions, and it's really finding out what's happening.

But the fasting is like when the jet engine is just idling and if you test it, you don’t see much, you see stuff under operating conditions. So to give an example, my colleague and co author, Dr. Gabor, his record is 512 units in a 2 hour insulin for a gentleman whose fasting insulin was not that high actually, I can't recall. But not very high, but 512.

It’s been beaten since by -- I forget who it was, one of the docs on Twitter. I think, crested 600 in a person. And these people, actually their docs -- they were overweight, and they had some lipid profile anomalies. And you know, they had some other issues in their bloods, but nothing dramatic. But with a post glucose insulin, you can see how dramatically the machine is screaming, so that person would have a silent scream from the lever, that unless you measure their insulin, pulse meal, or their GGT liver enzyme probably would show up. You’re not really sure how bad they are and how imminent their heart attack might be.

**Dr. Mowll:** Yeah. So you said that, based on Kraft's work and the Kraft curves, that someone with brand new insulin of 40 or above really would be considered diabetic and not conventionally necessarily, because that's really based on measuring glucose. And what we see a lot of times is that the body is trying to hold the glucose down but you do have this
high insulin. And as Dr. Kraft described, he would consider those people diabetic because they've got all the underlying mechanisms of diabetes.

**Ivor:** Yes, and they will get the pathologies of diabetes as he described. Essentially, if people are hyper insulin, abnormal curves, post glucose, they are essentially diabetic. He called them diabetes in situ. Because like if you have cancer cells, but there's not a full tumor, yes. Traditionally, they call that carcinoma in situ. They knew cancer was there, no question, but it wasn't yet a full solid tumor.

So Dr. Kraft borrowed that diabetes in situ. But if you have a bad curve, the worst curves in Kraft’s test -- in a Chinese study in 2015, over 11 years tracking non diabetics would have bad Kraft curve. There were full blown diabetics, up to 50% of those people 11 years later. People who got a good curve, only 3% were full blown diabetic. So the reason that the Kraft curve failure is so predictive of diabetes in your future is because it is diabetes, you’re already diabetic.

**Dr. Mowll:** And you made a really important point, is that you can have a lot of it. You typically will have the same diabetes pathologies, and many of them are caused by the hyperinsulinemia not necessarily the hypoglycemia.

**Ivor:** Yes. And this is a difficult one to tease apart. We know for sure the hypoglycemia, and glucose spikes, particularly in your blood damage your glycocalyx in your arterial wall. There’s Maria damage the glucose spikes will do. Not necessarily having a slightly higher glucose that levels throughout the day, not a big deal, but the big spikes.

So they are damaging, no question. And also the spikes in insulin and high insulin is damaging to many pathways. So it’s like when you become diabetic physiology, you’re giving your body a double punch; hyper insulin, and after meals, particularly hypoglycemia. And the two of them are just punching the hell out of your vasculature. And that’s why we see such enormous vascular disease rates in diabetic people.

Dr. Ron Rosedale called diabetes, the perfect model of accelerated aging. And he was very correct. It’s the perfect model of accelerated aging through many, many paths, some of which I’ll talk about in my talk tomorrow.

**Dr. Mowll:** Ivor Cummins, thank you so much. Can you talk a little bit about your book? And if people want to find that or find out more about you, where they can get that information?

**Ivor:** All right. Well, there’s couple of things. One thing is I work for Irish heart disease awareness, charity, that’s [www.ihda.ie](http://www.ihda.ie). And that charity seeks to promote the calcification scan. So we can talk about
postprandial insulin, or which blood test has passed, all the blood test pale in comparison to a middle aged middle risk person getting a quick CT scan and getting a CAC score.

And that will tell you more than all the blood risk factors besides -- and we'll catch the people who are really diseased. So my main role is to get the message out. And the book; *Eat Rich, Live Long*, written with Dr. Jeffrey Gabor covers everything you need to know about metabolic disease, their 60 recipes, meal plans, all the science, 300 recipes. And it's pretty much 100% five star reviews on Amazon. So we're very happy with that.

**Dr. Mowll:** Okay, so *Eat Rich, Live Long* is the book?

**Ivor:** Yeah.

**Dr. Mowll:** Get it on Amazon. And for people who want to learn more about the scan for cardiovascular risk, where do they get information about that?

**Ivor:** So www.ihda.ie is the primary source. But again, many of my lectures and talks I'll always feature within them and some elements of the calcium scan of the heart. So most of my talks will cover it too.

**Dr. Mowll:** Ivor, thank you so much for spending some time with me.

**Ivor:** Thanks a lot, Brian. Pleasure.
Dr. Mowll: We are here with Dr. Geo Espinosa, men's health expert. I'm excited to have you with me today, we're going to talk all about men's health.

Dr. Espinosa: All right. I'm looking forward to it.

Dr. Mowll: Yeah, and this is a very important area because one of the most important consequences or complications of diabetes, both type one and type two diabetes in men is sexual dysfunction/ erectile dysfunction. So what's the connection there? How does that happen?

Dr. Espinosa: Is interesting. So, certainly more so with type two diabetes, where excessive amount of insulin is producing and starts damaging the arteries. Poor artery architecture means poor erections, poor circulation, and erection is all about circulation. So anything that interferes with that process will cause erectile dysfunction. So diabetes, particularly type two is certainly more connected to your erectile dysfunction, as is metabolic syndrome, which type two diabetes is part of that factor connected, as well, to erectile dysfunction. So I think that one of the simplest methods to overcome or treat erectile dysfunction is by treating blood sugars and managing insulin levels.

Dr. Mowll: So once that's in place, you know, once a man is experiencing some sexual dysfunction, can that be reversed? Can it be improved?
Dr. Espinosa: Yeah, 100%. I mean, it depends on a scenario; you have scenarios where a man’s prostate is removed for prostate cancer, something damaged the nerve bundles that intravenous the penis. In that scenario, it’s very difficult, but in a non surgical situation. Absolutely, I see it all the time.

Again, if there is a metabolic syndrome situation, if there’s very high insulin, hemoglobin A1c that is too high, you manage those things. You know, help them sleep better. Some botanicals and things, absolutely it reverses. And then, of course, you have to deal with the psyche. You know, the biggest sex organ is the brain.

Dr. Mowll: So what are the various factors that would be causative to sexual dysfunction, erectile dysfunction in this case?

Dr. Espinosa: Well, certainly performance anxiety is big. You know any man in any situation would not be their best in a bedroom situation for many reasons. But now next time, they are about to get into a romantic situation, they’re thinking of the last time that they were not able to perform.

So that stressor causes adrenaline; so adrenaline is the chemical that is most powerful to inhibit a man from getting an erection. There’s no chemical outside the body or inside the body as more powerful. So that’s adrenaline. The other thing that’s happening quite a lot, that I’m seeing, is an excess amount of pornography watching. So that’s having an effect, particularly on the younger men from performing. And the people go, “So why is that?”

Well, we don’t know exactly. But when you look at these films, and you think that you should perform a certain way, or that your partner should be in certain positions, let say, or I should be this big, and I’m not that big. You know, these things start playing in their head. So there’s a lot of data to support that.

And then third is a lifestyle, that is connected to things like diabetes. What are you eating? What’s your diet, like eating a lot of donuts, and simple carbohydrates, that’s not going to help, that’s going to make things worse? So the better the diet, the more -- you know, exercise, sleeping correctly, and really managing this thing; metabolic thing is tightly connected. People are able to reverse that situation and become sexually active again.

Dr. Mowll: And is being overweight a big factor, as well?

Dr. Espinosa: Yeah, it is, as is smoking. So lifestyle factors and behavioral things are serious factors. Anything that either damages the arteries, or blocks the flow of blood in any way whether it’s plaque
formation or arteriosclerosis, heart hardening of the arteries, anything that will block the flow, or inhibit that flow will definitely cause erectile dysfunction.

**Dr. Mowll:** So when you do a workup on a patient, for example, you look at certain factors, what are the most important things you're looking for?

**Dr. Espinosa:** So we’re looking at testosterone, both total and free testosterone. There’s a hormonal element to getting good blood flow to the area, we’re looking at blood sugar, markers, things like glucose, insulin, and hemoglobin A1c. We’re looking at cardiovascular markers, lipid panels, it includes LDL, HDL total cholesterol, and then the sub particles, as well.

And you look at a full hormonal panel, not just testosterone. We look at estrogen and SHBG, which is a molecule that attaches to hormones. If that's too high, then you don't have enough free testosterone to do the work. So we look at a variety of things, and then assess where this patient is. I measure their waist to hip ratio to see how, you know -- typically your hip should be bigger than your waist, not the other way around. So we measure that. And that’s typical patient situation. And of course, I do ask, “Do you watch porn? And how much porn do you watch?”

**Dr. Mowll:** So if somebody gets their blood sugar under control, somebody who’s perhaps pre diabetic or has type two diabetes, and then they lose some weight, those things are going to help potentially.

**Dr. Espinosa:** They do help. Then you have to get over the psychological hump. So maybe they do need some of the pharmaceuticals to help. And I find that these pharmaceuticals help not so much physiologically, but certainly psychologically; kind of get them over the hump, “I could do this". And that's a big factor, you know, in terms of them feeling confident that they can perform.

**Dr. Mowll:** Are there other nutrients or botanicals or more supplements that can also be helpful?

**Dr. Espinosa:** Yeah, 100%. In my world, I deal mostly with botanicals and supplements, and then every now and then with some of the pharmaceuticals. Things that are important are Citrulline. So one of the chemicals that help your arteries dilate or open up is nitric oxide.

How do you produce more nitric oxide? Citrulline helps with that is a precursor to Arginine, which then releases the nitric oxide from the cells, from the arteries, and then arteries are able to open up. So Citrulline is very important. The other ones are things like pomegranate and resveratrol, they kind of help with the health of the arteries. Remember,
we said that bad arteries/ unhealthy arteries are no good. So these things help with the health of the arteries, pomegranate and resveratrol.

Then we use certain botanicals, adaptogens are very good. So these are things like rhodiola, ashwagandha, Siberian ginseng, excellent, because they kind of address stress in the body and they kind of balances out stress and stress chemicals that are produced including those that are produced in the adrenal glands; you know, cortisol and norepinephrine and epinephrine, those kind of things. So that's, in essence, the main go-to.

There's one more; epimedium known in the street as horny goat weed. What a name like that, you think there's no way that works, is too gimmicky. But it's turns out that there's a chemical Epimedium called Icariin. And that's actually a PDE 5 inhibitor. What does that mean? You inhibit this PDE5, which allows more blood in the organ; that's exactly the mechanism of how some of these drugs work Viagra, Cialis, and Levitra. They work by having this inhibiting effect of PDE5. So you find the same chemical in Epimedium called Icariin, which does has a similar pathway as to how it works.

**Dr. Mowll:** You mentioned earlier, Citrulline?

**Dr. Espinosa:** Yeah.

**Dr. Mowll:** And a lot of people have heard about Arginine as an HNO, inducer, and relaxing the blood vessels and so forth. Why Citrulline versus Arginine?

**Dr. Espinosa:** That's a great question. There's an enzyme in the gut called Arginase. So when you take Arginine -- this enzyme breaks down the Arginine, so that too much of this breakdown, then you don't get enough of it to where you need it, particularly in the pelvic area. Now, studies do show that arginine works, but it takes about five grams a day. And you need to take it three to four times a day.

With Citrulline, Citrulline is a precursor to Arginine. Study show that if you take Citrulline you have more Arginine in the body than taking oral Arginine itself, because it kind of circulates and that keeps your Arginine production going. So Citrulline, based on my research and my clinical findings, it actually works better in the release of nitric oxide, and production of nitric oxide, then Arginine by itself.

**Dr. Mowll:** Interesting. If a man has his testosterone levels tested and finds that they're low, which is very common as men age, are there some natural strategies to boost testosterone? And how important is that?

**Dr. Espinosa:** There are. So the more adipose tissue one has or the
most -- you know, I'm trying to be very scientific here. The more fat cells we have in our bodies, the more estrogen we produce. The more estrogen we produce, the less testosterone we have, they kind of work against each other. So one thing is to just get slimmer and fitter; more muscle, less fat.

The other thing is sleep; we need to take sleep seriously. I know that for most of us, and I've been guilty of that. You know, I don't have time to sleep, I have things to do, I have work to do. I have things to figure out; the more think the opposite way and we take sleep seriously, that will help with testosterone production. The production of testosterone happens roughly around 5am to 6am in the morning.

That's one of the reasons why men actually oftentimes wake up with an erection, because they're producing all this testosterone. So sleep is very important. Exercise, but not just exercise, specifically, less endurance exercise; so less marathon running. I would say in some people less even -- I hate to say I'm a CrossFit guy, I love it.

But for some people is not the right thing. It produces too much stress hormones. More weightlifting, particularly big muscles, legs, thighs, hamstrings and back. So there's a lot of data to support that. That's what you really -- and it has to be wheat resistant exercises, so very specific. And then some botanicals like Ashwagandha helps, quite a lot. And even Epimedium helps quite a lot in terms of increasing testosterone. I know there are some studies on Fenugreek, showing that it also helps.

But I don't think that one thing helps. When I help patients produce testosterone, they sort of doing everything; they're doing everything.

**Dr. Mowll:** One of the most common symptoms of diabetes is urinary frequency. And that's also common with prostate problems.

**Dr. Espinosa:** That's correct.

**Dr. Mowll:** So how does someone differentiate whether this is just a symptom of high blood sugar and diabetes? Or if this is a prostate issue that could be even more serious?

**Dr. Espinosa:** That's a great question. So you have to measure blood sugar levels and hemoglobin A1c, that's to be measured. So for example, in my world, I don't necessarily always assume is prostate. Now, it oftentimes is, but I don't make that assumption in that initial visit. Because I've seen, oftentimes, where people are pre diabetic, and that is actually causing -- they don't have full blown diabetes, but they have pre diabetes, and that's causing urinary symptoms.

The other thing is that you can have an enlarged prostate, but not
necessarily have urinary symptoms. You can have a small prostate and have urinary symptoms. So people will automatically think big prostate urinary symptoms, not necessarily the case. Okay?

Then you have the overactive bladder. And sometimes you have overactive bladder and prostate enlargement, or the prostate squeezing in the urethra, which is the tube that brings up the urine. Sometimes you have all three, blood sugar -- so you have to individualize the approach. And so what's really going on here? The first thing is testing blood sugar levels, when you do a prostate exam to see how big the prostate is.

And in my world, I treat things naturally, is always lifestyle first depending on how severe the situation is. And looking at the urinary, some guys are urinating, you know, seven/eight times a night, so they can't sleep. In that type of scenario, I would use a pharmaceutical. But you know, anything less or, let's say, three to four times a night, it could be managed very nicely with natural and functional medicine.

**Dr. Mowll:** And what are some of the best strategies to keep the prostate healthy to prevent prostate problems?

**Dr. Espinosa:** So the first thing you want to do is manage metabolic syndrome. It's interesting, my world of urology, you always try to find what is the common denominator amongst many of these urological situations and conditions.

Metabolic syndrome, it's one key factor that has an effect on prostate, prostate cancer, erectile dysfunction, enlargement of the prostate, even kidney stones. So metabolic syndrome, right. You want to, you know, have a small waist relative to your hips, you want to manage these lipids and fats in your body, these cardiovascular markers and you want to manage blood sugar, very important. So that's always the first thing.

Second to that; inflammation, so every time we do a biopsy on a prostate, even if there's no cancer there, there are always inflammatory markers in the prostate. So inflammation is a big thing. How do you deal and work with inflammation dietary, limit things like simple carbohydrates.

And even gluten -- I think for most of my patients, staying away from gluten and they do better. High amounts of, for example, curcumin. So I have patients take 1000, sometimes 6000 milligrams a day, depending on the situation. Boswellia, which most people use as an answer inflammatory for joint pain, that's an excellent bio botanical for the prostate, as well.

Things like green tea extract are very good. Reishi mushroom actually has shown to help men with lower urinary tract symptoms, whether
or not is related to prostate. And cranberry extract has been, in one randomized study, shown to be helpful in helping men with lower urinary tract symptoms.

**Dr. Mowll:** Dr. Geo Espinosa, so you have a book all about prostate health. And if people want to find out more about that or if you have some other great products, as well, and you put out a lot of good information, what's the best place for them to go?

**Dr. Espinosa:** You know, the best homepage is drgeo.com. And that's where I do a lot of writing and interesting things that are focused a lot on urology, urologic conditions and male problems.

**Dr. Mowll:** Great. And what's the book called again?

**Dr. Espinosa:** The book is, *Thrive, Don't Only Survive*; is my prostate cancer book. So the key message there is you've been diagnosed with prostate cancer. Great, high five. Now, this is the opportunity for you to live your best life moving forward. It's really powerful.

**Dr. Mowll:** Dr. Geo, thank you so much for being here with me.

**Dr. Espinosa:** Pleasure, Brian. Thank you.
Dr. Mowll: All right. So I’m here with Dr. Eric Westman, Duke University and founder of The Heal Clinics, which I want to talk to you about today because I think it’s very exciting. But you’ve been using low carb diet approach for diabetes management, specifically type two, pre diabetes for a long time. And I would love to talk to you about some of the benefits of that and maybe get into some of the studies that you’ve done, or sort of some of the background information that kind of validates this approach for people with type two diabetes. So I’ll just ask you now, why low carb?

Dr. Westman: Well, because it’s effective. I got into this in 1998, when two of my patients had done a diet like this, and I was curious because it clearly worked. And I thought I didn’t do anything, they did it on their own. If this was safe, this is this is fantastic. You know, you don’t even need a doctor. And they’d lost all this weight.

And looking at it, it turned out to be the Atkins diet. And at the time, Dr. Atkins had a clinic. So I thought, well, let me just go talk to him, and we did. And we did some research back at Duke. Dr. Atkins funded the first study out of his own personal checkbook, and then created a foundation after that. And you know, his comment was; nobody ever asked him to do research. And you know, he had been in practice for 30 years.

I sat in the office of Jackie Epstein, who I’m still working with today, and
Dr. Atkins. And it clearly work, but we had lingering questions about the safety. And so I didn't just start going out to use it. Because once I got into the depth of understanding, everyone was worried about eating the fats, and all of the cholesterol changes and all that. But now, you know, 15 years of research has been done.

And it shows that it actually it looks good when you cut the carbs and eat more fat. And the difference is that you get great glycemic control, which means your triglycerides go way down, your good cholesterol goes way up. And it turns out that it's a safe diet just for healthy eating. And, gosh, now that research can be done, if you put mice on a keto diet at middle aged, they live 13% longer than if they were eating regular carbohydrate containing Chow.

So if this extrapolates to humans, it might be that you even could live longer on a keto diet. So in the last 20 years, it has gone from it's going to kill you tomorrow if you do this to, you might even want to just do this forever, because it will make you live longer. That's a big transformation.

Dr. Mowll: So you had a couple patients who then you were curious what they were doing. I hear all the time, patients will say to their doctor, “Here's what I'm doing.” They'll look at the results and the doctor says, “Well, it seems to be working. So whatever you're doing, keep doing it.” But they don't seem to take that next step of curiosity, like maybe this could help a whole lot of my diabetic patients. What do you think is stopping them from wanting to apply a low carb diet?

Dr. Westman: You know, I've thought about that a lot. I mean, I guess the motivation of why someone went into the profession or medicine, for me, it was curiosity. I wanted to know how the human body worked, and I was curious. And for other people, it might be making money, you know. So if that's your motivation, you might just do. So the mainstream systems in place with the treatment of diabetes and other health problems for basically the use of medications, I kind of see today's medical world as a medication treatment system.

And you know, LCHF, or keto is disruptive. It means you change the food, which we're not taught about in medical school, and actually, then you take away medications. So it actually goes against what most doctors have been taught today. And that's why we're working on programs that are outside the main medical system, because we just can't wait for more people to know about this.

Dr. Mowll: Things are changing, but it seems like too slowly. You know, things have sped up with, I think popular books and so forth about keto diet, low carb diet, and of course, diabetes has continued to explode, really. But you know, we still need to get this word out to more people. I want to ask you about your Heal Clinics in just a few minutes, because I
think that’s one way to do that. But before I get to that, you talked about doing more fat. And a lot of people get confused about, we know low carb, but should I be focusing more on high fat? Should I be focusing more on high protein? Is that individualized? How do you help people figure that out?

Dr. Westman: Well, the system that I use is rather simple. And it’s using real foods, no additives, no extra oils and things like that. And it really predates the whole idea of using macros, using apps to figure out your 80% or 70%, 60% fat.

And so I don’t think we know what the optimal macro for fat is, and protein and carbs. I think you can do your own personal experimentation to try to figure it out. But in our research that we’ve done, it’s a range of fats from 60 to 80%, some 70%. But if you eat real foods, there are messages, keep the carbs really low. And the fat will join the proteins, you know, the meats, the poultry, the fish, and shellfish and eggs. So don’t add extra fats.

And that works for most people who are -- because the appetite goes down, people start burning their own body fat. And it just seems to be a corrective diet for so many things without worrying about the percentage of fat that you’re eating.

Dr. Mowll: And this is not a new diet. I mean, this is not a fad diet. You’re eating --

Dr. Westman: Since 1863. Is that a fad?

Dr. Mowll: If it is, it’s a very long running fad, right?

Dr. Westman: Yeah, been around since 1863. Is that a fad?

Dr. Mowll: If it is, it’s a very long running fad.

Dr. Westman: Yeah. Is it definition of a fad?

Dr. Mowll: We’ve talked a little bit about this, but can you maybe share some of the pre insulin dietary recommendations that used to be made for the management of diabetes?

Dr. Westman: I’m not having much training in this. I trained in internal medicine. So I got some knowledge about treating diabetes with medications, and then a pill and insulin and all that. It was quite a surprise to me when I was getting to the research to fill in the history of this; those 100 years ago, doctors were using the keto diet, basically LCA, Jeff diet, for treating diabetes.
So I was actually reassured that before there were any medications to treat diabetes, doctors were doing what made sense to me, which is just don't eat and drink sugar, or starches get digested to sugar, so limit the starches. And so if doctors didn't have medications, it would make sense to cut the carbs to treat diabetes. And essentially, that's what I'm doing today.

So I have a little, you know, brown book table from 100 years ago, and I pull it out and go, “Look, here is what doctors use.” Really, it's a 10 gram per day carbohydrate diet to treat diabetes and obesity. And it's the Osler textbook of medicine, which makes every internal medicine doctor sit up a little straighter, he's the father of Internal Medicine. And so it was just forgotten through the whole, you know, you got to have carbs, and you got to treat diabetes with medications, and not diet. And today, it's becoming clear to me that if you do eat a higher carb diet as recommended and go on medications that mean you're always going to have diabetes. This will locked you in to a lifetime of diabetes.

If you cut the carbs out and reverse the medications, you can actually treat and eliminate the diabetes. So the very thing that we think; doctors think, is helping the diabetes, is sentencing them to a lifetime of diabetes. But the idea of trapping someone into diabetes would never have occurred to me, you know.

And yet Tom Seyfried is treating cancer in animal models, has described how radiation for some cancers actually make the cancers worse. And I can see how insulin actually makes the diabetes worse even though in the short run, you lower the blood glucose; in the long run, lead to more obesity, which was the cause of the diabetes in the first place.

**Dr. Mowll:** So let's talk about the Heal Clinics. This was something that I think there's a great need for, and I know it's a massive project, but I think it's really exciting. So can you talk about maybe what you're trying to accomplish, and kind of where you are in the process?

**Dr. Westman:** Well, after being at Duke University now for almost 30 years, the waiting list to see me as an LCHF or Keto doctor, is about eight months. And you can only treat so many people as one doctor in one clinic. So it occurred to me and to a business group to why don't we make a company that trains people how to do this and have it outside the system.

So you can be free to grow it as fast as you need. So the Heal Clinics is the idea -- Heal means Healthier Eating and Living, and healing people. Heal Clinics actually scales up the availability of low carb keto teaching for anyone who doesn't have a medical problem at a distance. And for those who have a medical problem, they have to come to a clinical setting in order to get off medications safely.
So Heal Clinics is a way to spread the word about the keto diet. And actually, it’s a way to also give back to the world. We have investors now, actually, in the company. And you can invest at, it’s called an online public offering, wherever for as little as $480, you can actually buy stock in the company.

So we’re using this to jumpstart the creation and marketing of the clinics. You know, we’ve honed down the teaching. I have Jackie Eberstein, who worked with Dr. Atkins for 30 years as the lead director of education for the Heal Clinics. And our system is relatively simple. There’s no requirement of measurements of ketones or urine or blood or breath. It’s really just sticking to a set of foods; something that, again, has been used about 150 years, and it works really well today. So the philosophy is to keep things simple and easy, and to safely get people off medications as they no longer need them.

**Dr. Mowll:** Dr. Eric Westman, thank you so much for sitting down with me. If people want to find out more about what you’re doing, or the Heal Clinics or the products that you have available, what’s the best place for them to go for those?

**Dr. Westman:** Sure. The Heal Clinics information can be found at healclinics.com. healclinics.com/offering will take you directly to the online public offering that’s going on now only for another couple weeks. And then I have another company that’s developing truly keto products called Adapt Your Life. Adapt Keto Bars are very popular. They have two total carbs per bar without any added ingredients. So they’re very clean, very happy with that product. I only want the best. And so these two new companies are trying to take the knowledge that we’ve gleaned in a university setting for 20-30 years now. It’s pretty exciting.

**Dr. Mowll:** Doc, thank you so much for sitting down again.

**Dr. Westman:** My pleasure.
Extended Interview
Dr. David Perlmutter

Dr. Mowll: All right. So we’re here with Dr. David Perlmutter, and very excited to have you with me today talking about diabetes and the connection to the brain and Alzheimer’s disease because this scares a lot of people. It has become obviously, as you know, a huge issue. And there’s a very strong link between diabetes type two, in particular, and really all forms of dementia. So would you mind maybe elaborating on the connection and maybe sharing why there is such a strong connection kind of what the research is showing that we have so far?

Dr. Perlmutter: So first, let’s look at the numbers and then we’ll tease apart the mechanisms that may be involved. The numbers as they relate to Alzheimer’s disease are really quite profound. We recognize that even right now in America, there are 5.4 million individuals who carry that diagnosis. And that number is predicted to triple by the year 2050.

We’re spending right now about a quarter trillion dollars here in America to care for a disease that is pretty much preventable, by and large. You know, people want to believe that if you carry the Alzheimer’s gene, the so called ApoE 4 gene, that you’re going to get it. Well, what can you do? And the reality is that it is not primarily a genetic disease. It is a disease of lifestyle. It is disease caused by elevation of blood sugar.

And interestingly, as it relates to the topic of our discussion today, this is elevation of blood sugar even well below what we would qualify as
being diabetes. So it happens a lot earlier when blood sugar even begins to elevate to 105. This is associated with increased risk for dementia disease for which there is no pharmaceutical treatment.

This is an interesting study published in the New England Journal of Medicine in September of 2012. That demonstrated -- took a group of around 6,000 individuals and measured their fasting blood sugar at the beginning and followed them for 6.7 years. And what did they find? They found that those individuals who had elevated blood sugar had a dramatic increased risk for Alzheimer’s. But what was really quite intriguing is, this is blood sugar at 105, 110; well below when you are now qualified or diagnosis having Alzheimer's per se.

When we look at another marker of blood sugar called the hemoglobin A1c, which is more along the lines of an average of your blood sugar over a 90 day period. It's important to mention this because it's a lab test that people are kind of familiar with, since it's advertised on TV in correlation with various drugs that you could take to lower your A1c so people know about it. Even very subtle elevations of hemoglobin A1c are associated with dramatic shrinkage of the brain.

Actually, in excess of the shrinkage of the brain that's correlated with the Alzheimer's gene, that you can't change the Alzheimer's gene, but you sure as heck can lower your A1c. And the way to lower your A1c is not by taking a drug and continuing on with these lifestyle choices that are detrimental for you.

The way to lower your A1c is quite simply to take the sugar out of your diet, and at the same time, increase your dietary consumption of good fats. What you want to try to do once you're A1c is elevated, is to really think about getting on a more ketogenic diet. In other words, being on a diet that's going to give your body more ketones being produced, we know that that really establishes the sensitivity of each and every cell to the hormone insulin.

So you reduce what's called insulin resistance and you increase insulin sensitivity while you lower your blood sugar. You know, it's been known for quite some time that sugar is important for how the brain works. And one of the earliest things that we can detect in individuals long before they are losing their memory, which is characteristic of Alzheimer's, is we can see on specialized brain scans that their brains are not utilizing sugar, specifically in so called Alzheimer's areas of interest. And this happens decades before people begin to manifest the clinical signs of Alzheimer's disease.

So it's telling us that it's really an energetic issue early on. And what is really exciting is new work that demonstrates if you give people ketones, or put them on the diet that raises their types of blood fat that we call
ketones, the areas of the brain that previously were not lighting up when they were receiving the intravenous glucose are now back online.

So it shows that powering your brain with ketones can bring back online neurons that weren't working well before. And we really feel that the ability of a ketogenic diet to lower blood sugar and to reestablish sensitivity to that hormone insulin, is really fundamental in terms of an Alzheimer's prevention program, and even an important component in a program designed to actually reverse Alzheimer's disease.

Dr. Mowll: So it's not just the cutting the sugar out of the diet, or eating low carb, it's the ketones themselves; beta-Hydroxybutyrate ketone that has an effect on re sensitizing the body to insulin and/or improving the brain health.

Dr. Perlmutter: It's unclear specifically how a ketogenic diet actually improves insulin sensitivity. One thing we know that being on a ketogenic diet does, and you mentioned beta-Hydroxybutyrate, very important, as one of the ketones is it reduces inflammation. We know that inflammation as a mechanism antagonizes the insulin receptor, making it less functional.

So it may very well be through that activity that beta-Hydroxybutyrate is helpful in improving sensitivity to insulin. But beyond that beta-Hydroxybutyrate, in and of itself, is a powerful brain fuel that augments the brain's ability to create these energy molecules that we call ATP, while at the same time reducing the production of damaging chemicals that we call free radicals.

So you're getting more bangs for the buck with less damage. Who doesn't want that? We also understand that beta-Hydroxybutyrate acts as a cell signaling mechanism. What does that mean? It changes gene expression within each and every cell in your body. And this plays a very important role in the brain, because it's able to amplify the gene production of various types of chemicals that are really good for us.

For example, one called BDNF; Brain Derived Neurotrophic Factor. So being on a ketogenic diet is another way, because it turns on this gene to make BDNF that leads to the growth of new brain cells, and also leads to the brain having a better ability to form new connections, a process that we call neuroplasticity.

Dr. Mowll: Okay. So we're talking about preventing Alzheimer's and other forms of dementia, and actually helping people to reverse the progression of the disease. So what specifically is the connection to diabetes? You mentioned earlier that in many cases of Alzheimer's diagnosis is that the blood sugar isn't even in the clinical diabetes range, the blood sugar can be as low as 105. So what's actually causing the
problems in the brain? Is it elevated insulin or insulin resistance?

**Dr. Perlmutter:** Well, we never know anything for sure, but here is the current dogma as it relates to the role of insulin resistance in the pathogenesis of Alzheimer's disease. So what does insulin do and therefore, what might be compromised when we are insulin resistant and cannot participate in the wonderful things that insulin does. We recognize the primary function of insulin as being involved in the packaging of blood sugar, such that insulin takes sugar in the blood, puts it within the cell and then the blood sugar level goes down.

The other important part of insulin activity, and we'll get to the brain in just a moment, deals with its role in terms of leading to increased deposition of body fat, and keeping us from being able to use that body fat as a fuel source; meaning that higher levels of insulin are associated with increased production of body fat and locking it away so we can't lose weight.

And that is the reason that a higher sugar diet or refined carbohydrate diet, by virtue of the fact that it stimulates insulin production, ultimately leads to obesity. It's not the dietary fat, it's the sugar through the insulin connection. But beyond that, as it relates to the brain, insulin is really important in terms of being able to let sugar that we talked about as a fuel for the brain to get into the brain.

As the receptors for insulin on what's called the blood-brain barrier become less and less functional, i.e. we become more and more insulin resistant. It compromises the ability of blood sugar to get into the brain through the blood-brain barrier. Beyond that, recognize that insulin has atrophic effect on brain cells, meaning it nurtures brain cells. And that not just through insulin itself, but through a cousin of insulin, if you will, which is called insulin-like growth factor.

So in that regard, insulin is actually very important for the brain. But one other aspect of insulin, I think that really is important is that insulin functions to allow us to utilize ketones to power brain cells. When we become insulin resistant, we've lost the ability to power the brain cells with sugar, and we compromise our ability to use and even form ketones to use them as an alternative source.

So now we're in double jeopardy; we've compromised our initial ability to utilize glucose, and the backup plan isn't going to work either. So these are just a few ways of becoming insulin resistant, which is a manifestation of higher blood sugar, really sets the stage for brain degeneration.

**Dr. Mowll:** Really interesting. So in addition to following a ketogenic diet, or perhaps using exogenous ketones, are there any other simple
strategies that people can use to actually prevent Alzheimer’s disease or other forms of dementia?

**Dr. Perlmutter:** We don't have a treatment for Alzheimer’s that’s in the pharmaceutical arena, despite the billions of dollars that have been expended to create that magic bullet, it does not exist. As a matter of fact, though, there are Alzheimer’s drugs on the market, which are of two major classes; Memantine and drugs called cholinesterase inhibitors, which are widely marketed.

Not only do they not work, but as recent research published in JAMA online November 2018. Research from Dr. Richard Kennedy demonstrates these drugs are actually associated with causing or they're associated with a likely cause worsening cognitively in those individuals who are taking medications. That's maybe pun intended, a tough pill to swallow, that people are being given these drugs that actually are making them worse cognitively.

That said, we need to really embrace the reality that Alzheimer’s is, by and large, preventable. It’s a tough reality, because it’s an inconvenient truth. Why is it inconvenient? Because it puts the burden on the individual to make the changes if he or she wants to resist Alzheimer’s disease. And what does that look like? It looks like lifestyle changes that incorporate dramatically lower sugar, lower simple carbohydrate, lower starch diet, a diet that’s higher in good fats, higher and dietary fiber.

And it's a lifestyle that takes a real good look at why restorative sleep is important and doing everything you can to modify your sleep hygiene, to gain restorative sleep each and every night. It’s a lifestyle choice that looks at how much stress you’re exposed to and changes that situation very quickly, and perhaps as important as dietary changes. It’s a lifestyle that looks at the fundamental importance of aerobic exercise.

And now we know adding some resistance exercise into that equation, as well. Why? Because research demonstrates that aerobic exercise activates the genetic pathway to ultimately turn on the growth of new brain cells; who knew that we got a second chance on growing new brain cells? That’s a process that occurs throughout your life, and we can amp that up.

**Dr. Mowll:** Very powerful message, Dr. David Perlmutter, thank you so much for sharing this incredible information today. If people want to find out more about your phenomenal books and the work that you’re doing, what's the best place for them to go?

**Dr. Perlmutter:** I would say visit drperlmutter.com. Facebook is David Perlmutter, MD. And you can search David Perlmutter, that’s me on Instagram and Twitter.
**Dr. Mowll:** Dr. David Perlmutter, thank you so much for being here today and sharing this message with us.

**Dr. Perlmutter:** My pleasure. Thank you.
Dr. Mowll: Okay. So, I’m here with Dr. Datis Kharrazian, author of Why Isn’t my Brain Working?, which is a fantastic book. And also, you wrote a thyroid book a few years back called, Why Do I Still Have Thyroid Symptoms? or Why Am I Still Having Thyroid Symptoms? Great works. It brings, I think, both science, a lot of science, but in a practical way people can really understand it and apply it to their lives.

I’d like to talk to you a bit about diabetes and blood sugar today. And maybe some of the connections to the brain and other problems that people see who have diabetes and blood sugar issues.

Dr. Kharrazian: Yeah. Well, diabetes is definitely one of the key triggers to cause brain inflammation. And specifically, dementia and Alzheimer’s. So, in the scientific literature, they’re referring to Alzheimer’s type 3 diabetes.

Dr. Mowll: That’s right.

Dr. Kharrazian: So, we know that when insulin levels surge and then keyway. People know if their insulin levels are surging because they just get really tired after they eat. So, when they get really tired, they can’t get their glucose from the meal into the cell. There is a huge insulin surge. And that changes different energy dynamics. And then the person gets really tired. So, if you’re a diabetic, you’re constantly getting tired and fatigue after you eat. Then that’s also a sign that your brain’s getting inflamed every time that happens.
So, these insulin surgeries take place in those periods. And they turn on the cells in the brain called microglial cells. And the brain becomes really inflamed. And when the brain becomes inflamed, that'll lead to slowing down of nerve conductance.

So, people will notice that they can't think as well. They can't focus. They can't concentrate. Most people call it brain fog. And that's a really common pattern. And if that's persistent and keeps going on, it's pretty a very strong link that you're going to develop dementia. And then this diabetes pattern you have isn't just a metabolic issue. It's actually now going to lead into significant brain degeneration. And most specifically, Alzheimer's disease. But other types of neurodegenerative disease as well.

**Dr. Mowll:** So, we know that there's really no good medical treatment for Alzheimer's and dementia.

**Dr. Kharrazian:** There is no treatment to slow it down. There's only treatment to help with some of the symptoms once you get diagnosed.

**Dr. Mowll:** Right.

**Dr. Kharrazian:** So, if you don't control your diabetes and blood sugar in the early stages and it continues on. You are pretty much guaranteed or at a very high risk to significant degeneration brain.

**Dr. Mowll:** Yeah. So, we've got to nip this in the butt, so to speak. And catch it as early as possible. And I think high blood sugar, a lot of people watching this may have prediabetes or been told that their blood sugar is slightly elevated. Which I think is a misnomer. To me, if it's outside the normal range it's a problem.

**Dr. Kharrazian:** And also, if you're insulin dependent. The more insulin you take, the more inflammatory it ends up being for the brain. So, the healthier you can become to have less insulin requirements would be a great strategy for preserving your brain function.

**Dr. Mowll:** So, how does insulin trigger inflammation?

**Dr. Kharrazian:** So, insulin actually activates a known pathway. They call it the rage pathway. And that creates these inflammatory mediators that are released systemically. And those inflammatory mediators can cross the blood brain barrier and they turn on cells in the brain called microglia. 90% of the brain is actually microglia. And they activate these cells to create an inflammatory cascade. And then that causes neurons in the brain to start to get injured, basically. And they start to degenerate.

And there's also a process where they call it tau phosphorylation. So, there's a protein called tau. And it should be at an end of a microfilm tubule of a neuron, like the structure of the neuron. But what happens in this inflammatory reaction is this tau, it dislocates. And they cluster together. And that is what becomes what we call a tauopathy. And then this starts to create the whole process that's involved with the
development of Alzheimer’s disease.

**Dr. Mowll:** In addition to dementia and Alzheimer’s disease, what are some of the other problems that can develop from brain inflammation?

**Dr. Kharrazian:** So, brain inflammation is going to lead to, in addition to like brain fog. When the brain gets inflamed, there is a known behavior called Sickness Behavior Syndrome. And this is where people have excessive need for sleep. They get depression. They can’t get out of bed. There’s lack of motivation.

So, in a clinical setting, one of the things we see is like if someone has a trigger to activate brain inflammation. A person basically has no motivation, no drive, no energy, needs excessive amounts of sleep. And this is a common feature of many people with diabetes. And they really think it’s just their blood sugar control. But it’s actually inflammation in the brain.

So, it’s a very common mechanism. And if a person already has an injury to the brain, so there is a mechanism called priming of glial cells. Where they’ve had a past injury cells in the brain, where they are really more overactive.

So, it can be really significantly devastating for some people. Every time they get these huge blood sugar surges. If you look at the chief complaints, it is not really fatigue. It is they can’t motivate. They can’t get excited. They have no focus. No concentration. And if you’re having those symptoms, your brain is in serious trouble. And if you don’t control your blood sugar, you’re going to have significant neurodegenerative risk if you don’t already have some degree of Alzheimer’s plaque development.

**Dr. Mowll:** So, a lot of people with diabetes and blood sugar dysregulation are experiencing these symptoms. But I don’t know that they’ve connected the dots. Because doctors, you know, conventional physicians typically don’t connect those dots for them. But this is a big deal. And I think it should really open some eyes.

**Dr. Kharrazian:** And there’s also some research that’s showing higher HBA1C levels, are linked with the blood brain barrier breakdown. So, there is supposed to be a barrier that protects our brain from chemicals, pathogens, and other inflammatory triggers to get into our brain. So, we know that HBA1C levels be very high, that creates what’s called oxidative stress. And this oxidative stress starts to break down the blood brain barrier.

So, not only does inflammatory meters cross a healthy blood brain barrier. But when you have uncontrollable ins and surges, you create this oxidative stress response that breaks down the barrier. And now your brain is really in trouble. So, if your brain has breached blood brain barrier and now you have activation of inflammatory mediators from the insulin surge, I mean it can be devastating.
Dr. Mowll: It's like a double whammy with the high insulin and the high glucose and the glycation that comes from that. So, you've done a lot of work with diabetes over the years. And I know that each patient is different. So, we have to approach them individually. But when you look at someone with blood sugar dysregulation, what are some of the key things that you're working on with them?

Dr. Kharrazian: Well, I mean, one of the first things is like if someone is diabetic, you go, do they have a diet and lifestyle that justifies their blood sugar issues? So, there's some people that come in and they go, “Hey, I work out all the time. I eat well. I have no idea why I'm diabetic.”

Dr. Mowll: That's right. That's right.

Dr. Kharrazian: That's a completely different patient, then do I really have to give up soda?

Dr. Mowll: Right, for sure.

Dr. Kharrazian: So, right away, for me, I categorize it into are these mechanisms that clearly indicate insulin resistance development or are they not? So, if they're not, then your question is why. So, one of the most common causes is autoimmune mechanisms, right? So, late autoimmune diabetes development in adulthood. That's a common mechanism. So, we check auto antibodies to their [inaudible] to see if that is involved.

But another mechanism is you can just have significant amounts of inflammatory reactions and stress that dysregulate the insulin receptor unrelated to just a diet that's high in sugar. So, if someone is eating a very inflammatory diet, like I'll give you an example. The vegetarian, that's the junk food vegetarian.

And all they're doing is eating like fried food, lots of bad foods, trans fats, and all those things. They could have an inflammatory reaction. And even actually HBA1C, is more of a market for inflammatory reactions than it is for blood sugar itself. Because remember glycosylated hemoglobin is a free radical reaction against a red blood cells in the hemoglobin. So, you don't have to have just high carbohydrate in your diet. You can just have an inflammatory type.

So, there's two different approaches. So, there's some people that's so obvious like, “Hey, you just can't eat soda all day, you can't eat that much sugar, and you have to physically move. Until you do that, you have no chance.” And then there is others like, “I'm already doing all that.” Then that is a completely different scenario.

Dr. Mowll: Absolutely.

Dr. Kharrazian: And then, you know, for most people there's a mixture of both. So, that's kind of how I first approach is to managing diabetes.

Dr. Mowll: Okay. And I think the latter group is probably the ones that you and I see the most. The ones who have already made some of
those lifestyle changes and are now looking for a functional medicine approach, a higher level approach to really root out what is driving my blood sugar high and causing all these problems.

So, if people want to find out more about your work, Doc, where do they go for that? And I know you've got some good programs as well.

**Dr. Kharrazian:** Yeah. We do have a program, it's a six week program called Save Your Brain Program, which just teaches people, one of the mechanisms is to control your blood sugar and really look at all the different factors of lifestyle that support your brain. But it's all available at DrKNews.com.

**Dr. Mowll:** Great. DrKNews.com. And check out the book, *Why Isn't My Brain Working?* And thank you so much for being here, Dr. Datis Kharrazian.

**Dr. Kharrazian:** Thank you. Appreciate it. Thank you so much.
**Dr. Mowll:** So, I'm here with Dave Feldman. And we're going to be talking today about lipid health, specifically with diabetes. And this is a big concern for people with diabetes and metabolic problems. Their doctors are always pounding, you know, get the LDL down. And putting them on statin drugs. It’s part of standard conventional recommendation.

So, just kind of want to talk about this topic a little bit maybe. And shed some more light on it for people who are concerned about this. So, for people who have diabetes, metabolic issues and so forth, insulin resistance. What do you think is important, first of all? You know, when evaluating lipid health. And then maybe we can sort of paint the picture of sort of how the lipids work? And what to measure, all that too? But what do you think is important to look at?

**Dave:** Of course, like many people I would have originally said LDL cholesterol. It’s what I’ve grown up with. It’s what you’ve grown up with. It is the biggest single concern. And certainly, as I’ve come to understand a lot more within lipidology, in particularly a lot of the studies that are out there, I’ve come to recognize that actually HDL cholesterol, the so-called good cholesterol. And triglycerides, which is a measure of the fat in the blood are actually extremely important. And of course, if you go on a low carb diet, you tend to see your HDL go up. And your triglycerides go down.
You may or may not know that actually I have an energy model, as I like to call it. That may help to explain why it is that people who go on a low carb diet. Particularly as they get healthier or if they are in fact already lean and/or fit. Might see a pronounced increase in their LDL cholesterol. Even though they likewise will have often an increase in their HDL cholesterol and a dropping of their triglycerides. And as of yet, every single study I've been able to find, which hasn't been a lot, that have grouped all three. High LDL, high HDL, and low triglycerides show a reduced rate of cardiovascular disease.

**Dr. Mowll:** Okay. So, that's key. Because again, the target of treatment for most physicians with their diabetes patients is the LDL. They're trying to get that LDL down or the total cholesterol perhaps. But you know, more recently it's really been focused on LDL. So, do you think LDL is important? Is it relevant? How should we sort of analyze the LDL on a standard lipid panel?

**Dave:** Well, the short answer is, we don't know. And I'm very careful to say that, I don't make the claim that I know for sure whether LDL causes atherosclerosis independently. That's kind of the key. A lot of times there's a lot of recognition as to how much it's associated with heart disease. Rightly so, because the buildup of plaque in the arteries includes cholesterol. But it also includes macrophages, which are part of the immune system as well. And you don't actually try to limit those also.

So, the question is where the problem originates? And is it the concentration of LDL cholesterol alone? Or for that matter, what carries it? LDL particles? And thus far, I have to say I don't think that the evidence is quite as, I guess you could say, as confidently conclusive as the literature would have you believe.

**Dr. Mowll:** Could you explain what LDL is? And sort of how it gets processed in the liver and so forth? And how we end up atherogenic lipid proteins or lipid particles?

**Dave:** I will have to get a little geeky here. But what's neat is your body actually has basically a kind of traffic system on how it delivers things in your vascular system. And the way it does it is, if it's something that doesn't mix well in the blood, which are lipids. Lipids are like fats. Then it makes something for which it can carry it with. These are proteins. Lipoprotein is like a lipid carrying protein. And it makes them basically in two places. Makes them in the gut from food you just ate, those are called chylomicrons. And it makes them in your liver, typically from energy from storage. And those are VLDLs.

And I emphasize energy because fat-based energy, if you run on it, you're going to be trafficking a lot of these lipoproteins. Particularly chylomicrons in VLDLs. And the energy models suggest that indeed, if
you are trafficking more VLDLs, they are the precursor to LDLs, as they
drop off their triglyceride cargo to fuel your body. It's why you have
less triglycerides. You're actually using them more. Then it eventually
remodels to an LDL. And then we'll remain in the bloodstream for
anywhere from two to four days.

But pretty your question, is that in fact causing atherosclerosis? Is
having a low carb, high fat diet and trafficking more of this which leaves
remaining LDL particles, is that driving itself into your arteries? And
again, short answer is, I don't know. That said, we have a number of
people inside the low carb community, we like to call hyper responders.

And there's a particular phenotype that I like to study called lean mass
hyper responders. Lean mass hyper responders have a total cholesterol.
Actually, an LDL cholesterol 200 or higher. An HDL cholesterol of 80 or
higher. And triglycerides are 70 or lower. And that might sound like a
very distinctive specific profile. But you'd be surprised, there's quite a lot
of people who fit this.

And they tend to be very lean and very fit. But given how high those LDL
levels are, they're actually comparable to somebody who has a disease
known as familial hypercholesterolemia. Yet, they don't seem to be
getting the same symptoms as somebody who has the genetic disease.
Suggesting that perhaps the disease is much more specific to what it
is that's resulting in this atherosclerosis, this buildup of plaque, maybe
more so than this metabolic reason. Which is those people going in a
low carb, high fat diet.

**Dr. Mowll:** So, it makes sense. If someone eats more fat, they're going to
be trafficking more fat, as you said. So, the particles that carry these fats
are going to increase. So, we get a higher VLDL first and then a higher
LDL. And that doesn't necessarily mean that it's going to lead to plaques,
atherosclerosis, and problems. It just means they're carrying more fat in
the blood.

There is a step though where those can become oxidized and start to
attract immune cells. You know, inflammatory cells that then could
possibly, there are some theories that say, it could possibly then lead
to atherosclerosis or vascular damage. So, how does that happen? How
do these LDL particles get to the point where they get oxidized? And
potentially can lead to problems?

**Dave:** Well, this is actually an interesting subject. Because that is the
concern is that you have so many LDL particles that they're more
prone to be oxidized. And therefore, will remain in the system longer.
Eventually wedged their way into the tissue. And then start that
plaque process, right? And I find more and more from an engineering
standpoint, that particularly as you find how much of an immune
response LDL particles are a part of. I’m getting more and more skeptical as to the direction of causality.

So, it’s also something to put on the table. The LDL particles, part of their job, as crazy as this sounds. Part of their job is to be the one to get oxidized instead of, say, your cellular membranes. Where there could be a chain oxidative effect, right? So, which would you rather? Would you rather have the LDL particle get oxidized? Or would you rather your cell membrane gets oxidized? I’m going to guess I’d rather my LDL particle oxidized because as it happens, there are already scavenger receptors throughout the vascular between both endothelia cells. Something called Locks 1 and scavenger receptors themselves.

And other receptors such as CD36. Again, I know, I’m getting a little geeky. These are all designed to actually capture a modified LDL particle. As in it’s no longer healthy and it’s been modified in a way that it would be associated with being problematic. But the whole process by which we then say, “Oh, now atherosclerosis is begun.” It’s not something that we actually have say nano cameras on the inside to see when that began.

So, how do we know that they’re not part of the vehicles that are being associated with the perpetrators? Instead of the perpetrators themselves? You see the problem.

Dr. Mowll: So, what about some of these other, again, atherogenic lipid proteins like, lipoprotein a, and the idea of doing a more comprehensive analysis where we are looking at LDL particle numbers, size, and so forth. How valuable is that? And what can we glean from that?

Dave: Well, an LPa is a very interesting lipoprotein. For those people, we’re really looking into it. It’s the one that typically comes with a tail. These are crinkles that are on it. And what they find is that, yes, it does tend to get associated with cardiovascular disease. But as you look a little bit deeper in the research. It’s because it’s typically an acute phase reactant.

Now where this gets interesting is, there seems to be a number of people. And in fact, my colleague Chavonne Huggins is one of them. Who just appear to have genetically higher levels of LPa. And in tomorrow’s a speech, I’ll actually be bringing this up. She has shown that it too, moves up and down with the inversion pattern. Which I talk about a lot in my lectures where I can actually eat a lot more fat, drive down my LDL or taper off on the fat, and it brings it back up again.

Well, LPa, the fact that it’s also moving around with the metabolism. That to suggest that perhaps where it is somewhat metabolically influenced. And getting back to kind of the core arc here. I’ve yet to find
any evidence when you have circumstances such as HDL being high and triglycerides being low. That that's associated with atherosclerosis.

In fact, I want to kind of bring up a profile, a commonly known literature as Atherogenic Dyslipidemia. And that is very well known to be very, many would just say straight up, causative of atherosclerosis given how tight the association is. And it has three things in common. It has low HDL cholesterol, high triglycerides, and a preponderance of small dense LDL particles.

Now as I was kind of saying a little bit earlier, I think these three aren't so much driving the disease. I think it's more likely the disease state is being reflected in the lipo profile you have.

**Dr. Mowll:** So, if someone does have a high LDL and a very low triglyceride levels, they can probably more confident that they maybe don't have that disease state that's driving that dyslipidemia.

**Dave:** And I’m always careful to tell people where their comfort level should be.

**Dr. Mowll:** Sure.

**Dave:** So, I can just say what it is for me personally. And I’ll use an analogy to kind of really drive this home. If we saw out here a harbor, and there were a bunch of boats, right? And the boats were leaving the Harbor. They were coming back over and over again. And we went out there and there were a hundred boats. And I said, “Oh, that's way too many boats. They shouldn't need that many boats.” You said, “Now, hold on, Dave. Let me just watch. Oh, no, it looks like they keep coming back empty. So, it seems like they are delivery their cargo correctly.” “All right, fine.”

Then we come back tomorrow, we look down, and there's a thousand boats. “Okay, well now that's way too many.” You go, “Now, hold on, hold on. Let's watch.” And sure enough, all of them are going out, all of them are coming back. And you say, “Dave, I think the demand for the cargo in those boats is probably multiple times ten. But I feel pretty confident that they're getting successful at dropping off that cargo by the fact that they keep coming back. It seems to be working just fine.”

Okay. Now let's switch it. Let's say that the harbor, it's got a whole bunch of boats, whole bunch of cargo, and they're not going anywhere. Harbor is just full of it. That's what we tend to see in somebody who's an atherogenic profile. They tend to have high VLDLs. High remnants, right? Because their VLDLs never get a chance to park that energy. And then remodel to LDL. And we tend to see a lot more inflammation as well. People pass their personal fat threshold. We tend to see higher insulin
levels. Things like C-reactive protein. All of these markers often are all correlated together.

LDL, I believe, at least once you consider this, is a downstream result of a more atherogenic profile. Not that they themselves are necessarily inherently atherogenic.

**Dr. Mowll:** Dave Feldman, Cholesterol Code? What is that?

**Dave:** That’s actually a blog I started from, I want to say like, three years ago. It’s now become kind of a clearing house of sorts. We have a lot of materials there for people to be able to learn about, you know, what does high cholesterol on a low carb diet mean? We’ve got videos there as well. And of course, my colleague, Chavonne Huggins, helps me answer any questions that people may have.

We also have a great tool where people can kind of feed in their own numbers. And get back sort of what the risk calculators are. Based on the ones that we tend to find a little bit more relevant, like Renick cholesterol and atherogenic index of plasma.

**Dr. Mowll:** Excellent. And what’s the website?

**Dave:** It’s CholesterolCode.com.

**Dr. Mowll:** CholesterolCode.com. Dave Feldman, thanks so much for spending some time with me here today.

**Dave:** Thank you for having me.
Dr. Mowll: All right. So, I’m here with Dr. Dan Pompa. And Dr. Pompa, you have done a tremendous amount of work with detoxification over the years. There’s a long story behind that. But I think what I’d love to have you share is some real practical things that make sense to people. And maybe we can tie this back to weight loss resistance, blood sugar dysregulation, and diabetes. So, how do you see those things relating to toxins and detoxification?

Dr. Pompa: You know, it’s on the topic. And I understand how people think they wouldn’t make a connection with the detox, with the diabetes, or the inability to lose weight. However, this morning, I had a conversation with actually two different women, about how when they started cellular detox. Which there’s different types of detox, cellular detox is actually where real detox is. And how they were all of a sudden able to lose weight.

Now, when you understand weight loss, it’s a hormone issue. So, I’ll make a pretty bold statement. Weight loss has more to do with hormones. Hormones are like insulin, right? Which is a player in diabetes, then it even does the foods you eat.

But of those women, were already eating, especially around these parts of the healthy environment that we put ourselves would eating a perfect diet. And yet neither of them could lose weight. So, to my point, now, no doubt about it, a poor diet. And I’m a guy who teaches about diet as you know, fasting, and a lot of strategies. So, you know, absolutely for
the right diet. But the point is, so much of hormone resistance, diabetes, weight loss resistance is in fact toxin induced. And really less to do with diet than we think.

**Dr. Mowll:** Can you differentiate between what many people might think of when they hear detoxification? And what cellular detox is?

**Dr. Pompa:** Yeah, yeah, great question. Because if you do the colon cleanse. If you go to a health food store, actually there are whole sections now, where it used to be maybe a couple of products. So, it’s in vogue. Detox is in vogue.

But the point is though, is most of those things, the 10-day cleanse, the 21-day cleanse, I call them poopers. So, meaning that they get you going, right? And people think that is a cleanse. And there’s nothing wrong with that. I mean, if you’re constipated and backed up, that’s not good. So, it’s not that I’m against those things. But that’s not real detox. Real detox, you have to go to the cell. And my saying is, “You have to fix the cell to get well.”

But more specifically you have to detox the cell to ultimately get well. Especially with conditions like diabetes and like weight loss resistance. And listen, when you look at why people don’t feel well. It could be sleep. It could be anxiety. It can be just general lack of energy. Those are cellular issues, typically driven by a toxin of some sort. And the average colon cleanse or the 10-day cleanse, that is not getting to where the problem is. Because the hormones actually communicate with every cell in your body. And the hormone receptors are on the cell. So, that’s where you have to get to.

**Dr. Mowll:** So, what cells are we talking about? Are we talking about every cell in the body? Are we talking about specific organs?

**Dr. Pompa:** Every cell, and that is a great question. I mean, every cell in your body, every organ of your body has specific cells. Every tissue has specific cells. And your body has to communicate with all of them via certain hormones. It goes more than that. There are things called redox molecules.

The bottom line is this. Your body is an innate intelligence that has to communicate with every cell in the body. And every cell has receptors to those things that we would call hormones that make you feel good. That give you the ability to lose weight. Remember, insulin is the fat storing hormone.

So, therefore, if you have a receptor problem on the cell to insulin, you’ve got a fat problem one way or another. And just because you are skinny doesn’t mean you don’t have a fat problem. Because most of those people are storing fat in their organs, which is arguably even more dangerous.

**Dr. Mowll:** So, what is a toxic cell? And how would someone know they have toxic cells? And then what are the health problems or implications
that can come from having toxins building up in the cells?

**Dr. Pompa:** What is a toxic cell? A toxic cell is an inflamed cell. Let me pull back into what we know. I think most people watching or listening to this would say, “Inflammation. Yeah, I've heard it. It's the cause of all these diseases, right? Including diabetes.”

Well, what do we mean by that? I mean the sore shoulder is inflammation and there's cells that are inflamed. But we're talking about typically systemic cellular inflammation. Meaning the membrane of the cell is inflamed. By the way, that is where the hormone receptors are. And that creates that resistance to the hormone.

So, toxins are the number one driver of that inflammation. I mean there's other drivers, right? I mean, just high glucose alone is a driver. But many different drivers. But toxins are that hidden cause that really nobody's talking about. So, an inflamed cell. How do we know, second part of your question? I mean there is a simple urine test called a Meta-Oxy Test that measures something called malondialdehyde. You can look at oxidation if you will of the cell membrane. It's an indicator. And it's a very simple and easy test. I mean, we can provide a link for it here. I mean, it's not hard.

Then there’s C-reactive protein. And other blood markers we could look at and say, “Oh, you're inflamed.” But you know, really, we're looking at a cellular inflammation in some aspect. But look, most people watching this may not do that.

But symptoms. How's your energy? Do you have brain fog? Do you have hormone problems? Do you have problems losing weight? Do you have to eat six meals a day or eat all the time? Do you break your diet all the time because you just can't help but have those carbohydrates? Those are all symptoms of cellular inflammation driven by a toxic cell.

**Dr. Mowll:** Yeah. That makes a lot of sense. So, you've got toxins and other things. But toxins in this conversation driving inflammation in the cell that leads to insulin resistance. Which obviously leads to diabetes, it leads to weight loss resistance. A lot of people have this stubborn weight that they just can't get off. So, how do we detox the cell? Or how do we reduce the inflammation? I mean, stop the damage from happening to those cells?

**Dr. Pompa:** I mean, I teach doctors around the country, my protocol. It's a multi-therapeutic approach, right? Of different dietary strategies from fasting strategies, longer fast, shorter fast. My diet variation, not sticking to one diet. But how to force an adaptation in the body and force a change. When you force adaptation, you force a hormone optimization.

What does that mean? Meaning that if you work out, what happens? Your body has to adapt to that stress. If you work out too much and don't rest. You don't adapt and you get weaker, not stronger. But when you do adapt, you get stronger. So, your body adapts to that workout by optimizing certain hormones. Your testosterone goes up, male or female...
doesn't matter. Your cells become more hormone sensitive. All those things occur to adapt. And you become better. Cellular energy gets better, you get stronger muscles, you get all that via adaptation.

Dietary changes. Something I call feast famine cycles can emulate that same forced adaptation. And creates a hormone optimization where the cells get more sensitive to hormones. That's what you want. You want your cells to be able to hear the hormones.

Now, you asked the second part. So, that's part of the strategies that I teach. But the detox, I've developed what I call my five Rs. It's a roadmap to how you fix a cell. And ultimately how you detox the cell. And you know, I used to use that just as the roadmap for doctors to like, “Okay, if you don't fix these five things.” And really out of the five, four are cellular functions. “If you don't fix these things, you won't ever really truly detox.” Because these are the pathways that our cells already are designed to do this, to get rid of toxins. Even when your cells make energy, it makes a toxin. So, these pathways are very important that your cell upregulates to detox.

Now, when we're exposed to so many different toxins, too many at once, if you will, or through a lifetime of very toxic living. Those pathways in the cells shut down. And when that happens, you can do all the colon cleanses you want. You can do all the liver cleanses. You can do all the coffee enemas, saunas. The fact is you have to upregulate with the cell naturally does. That's where the real detox.

Now with that said, that is one aspect of what I call true cellular detox. Upregulating the cell function to detox. Then we use real binders and chelators to make sure that the toxins go all the way out of the body. One of which is promoted here, cyto-detox. So, real binary grabs it, doesn't let go. And it's a vehicle to get the toxins out of the body.

If your intelligence and your body senses that toxins are redistributing. Guess what it does? It won't let go. And then, guess where most of those toxins are stored, in fat cells. So, it's another reason why you don't lose weight. And your body's literally holding onto its fat to protect you from the toxins. It doesn't want to let go.

So, the bottom line is we upregulate that cell function. We provide this vehicle, so you don't redistribute the toxins and get worse, not better. And then we have another binder that just sits in the gut. So, you don't reabsorb toxins from your gut. It's called autointoxication. So, that's a system years ago I created. Its nickname is true cellular detox. Upregulating the cell, using binders, real binders that don't let go to escort it out, grabbing them in the gut so you don't reabsorb. So, that's kind of the heart of what I teach.

Dr. Mowll: Would you mind sharing those five Rs? Because I know a lot of people just heard that and are wondering what those five Rs are?

Dr. Pompa: Yeah. You know, I mean it really has caught on in the public. I used to just teach it to doctors. I remember, I was literally lecturing to
a group of doctors and I could just tell they weren't getting it. You know? And just because they were doctors, they were like not understanding these functions. And I'm all excited about like, this is how I got my life back and thousands of others. And I could tell that it was going over their head. And literally, I was on an airplane ride home and I started, just there they came. So, I have to say that it was divinely given, honestly. I can't say that I was smart enough to come up with it. Sometimes the simple things are the most brilliant things. And that was given to me.

R number one is removing the sources. So, I said four of them are about the cell function. This is the one that's not. Meaning that you could do all these amazing things. If you have toxic sources in your life, it's all for nothing. So, very quickly, I'll throw out the hidden ones that people miss. Because people think of, you know, drinking out of plastic. Or perhaps their makeup, their water, their air. Especially air, that's probably a big one.

But people miss it that these silver fillings are 50% mercury and vaporize mercury right into your brain, every day, right? And then hidden infections, things like root canals. There was a movie recently put out there and taken off Netflix called Root Cause.

**Dr. Mowll:** That's right.

**Dr. Pompa:** Yeah. And it was really about how these hidden infections, either root canals or we would call cavitations. That's an infection in a jaw typically where you had a tooth removed, extracted. It heals over, you have no pain, but there is an infection driving your immune system down.

**Dr. Mowll:** Yeah. And those by the way, are a major cause of heart disease and diabetes with that inflammation.

**Dr. Pompa:** Absolutely. Hidden cause. And massive, massive epidemic of people who literally it drives autoimmune. And so, much of diabetes, as they're finding out is autoimmune. I know we think of type 1 as autoimmune. But now we're actually realizing type 2 is very autoimmune. Meaning your body literally is attacking itself, driving that cellular inflammation. These hidden infections are a big causative factor.

I've done Facebook interviews, my podcast interviews with people who after they get these hidden infections correctly dealt with, literally their life transforms, their autoimmune drops like within weeks. Oftentimes before they leave the dental office, they're chronic pain goes away or some symptom that they're dealing with. So, these hidden infections are a big hidden toxic source.

And then the last one is mold. Mold drives weight loss resistance, insulin resistance. Massive, people all of a sudden can't lose weight, gain weight, anxiety, sleep problems, hormone dysfunction. All because of a mold situation that they didn't even know they were in. Because typically you don't see it. So, I mean, there's three heavy metals, hidden infections, and mold, are three that a lot of people don't think about.
So, you know, hopefully people watching this, it gets you thinking. So, removing those sources, right. And oftentimes it’s some of these ones that we’re not seeing or thinking about that are the biggest problem.

R number two is regenerating the cell membrane. I could do hours just on that. But I won’t bore you with the details, folks. I’ll leave it as simple as this. The cell membrane, I already pointed out. That’s where your hormone receptors are, including your insulin receptors. And if you don’t fix that membrane, you don’t fix your hormones. But it’s also what determines what goes in the cell and out of the cell. So, it is the cornerstone of detox. And how many people are actually teaching on that? I teach courses on fixing the cell membrane.

R, number three, is restoring cell energy. Cell energy is a big, big topic. Every detox process in your body and your cell needs enough ATP. Which is our cellular gasoline. It’s the energy. We have to restore that to upregulate the functions of the cell that naturally start to detox. And so, it’s a huge, huge subject.

Four is just, and it seems like the obvious. But reducing inflammation of the cell. That’s again, that’s the inflammation, what’s blocking those hormone receptors. And I teach many strategies there, including a lot of those dietary strategies I was talking about.

Lastly is reestablishing methylation. Methylation, I think people are hearing more about. When I used to talk about it years ago, you know, people were just, what does that mean? But methylation, a lot of people are hearing about it from MTHFR gene. And they’re defining themselves as this inability to methylate. Yeah, I don’t like that. Because I think we are learning now that just because you have those genes, the body has an ability to go around them. It’s a little more complicated than that.

But needless to say, it’s brought this to the forefront of an understanding that methylation affects your hormones. Methylation affects diabetes. Methylation affects how your cells use energy, including glucose or fat. Methylation is at the cornerstone of how your cells detox. Because there’s something called glutathione in every cell. And methylation parallels that. So, if you don’t fix methylation, you don’t fix glutathione, there’s this relationship.

So, those five things are what we focus on to really fix a cell, get it functioning, and ultimately get a detoxing. And ultimately getting and hearing your hormones. That’s the key to fixing hormones. You have to get the cell hearing it.

Dr. Mowll: And that’s exactly what type 2 diabetes is. We have to get the body hearing insulin again and responding. That’s right.

Dr. Pompa: Insulin resistance. But see, it goes beyond insulin. As you know, most people with diabetes end up with thyroid conditions, right? And most people with thyroid conditions end up with diabetes. And I would argue there’s a lot of, they end up with estrogen problems. And I could keep going down the list. So, the point is you’re not just
resistant to insulin. This resistance happening to other hormones and other chemical messengers that your body has to make. So, you know, no doubt, people don't die from diabetes. They die of the complicating factors around it. And then we don't talk about, you know, the life of misery of degeneration that goes on, right? All the degenerative conditions that happen.

Here's the big problem. Your doctor, you go to the doctor, they're trained. So, technically not their fault. But, “Oh, we got your glucose looking better.” So, it's a high five. And on your way out the door. And not really understanding that your cells are still in a state of hormone resistance. All we're doing is forcing the glucose into the cell. Forcing it here or there in other cells. Pushing the glucose out. “Oh, we got out of the blood. That looks great.” But meanwhile we haven't really dealt with the real problem.

**Dr. Mowll:** So, powerful. If people want to learn more about you and your work, I know you have more books out there.

**Dr. Pompa:** Yeah. It's coming, it should be out by the time they view this. But it's called *Beyond Fasting*. Which the book goes beyond fasting, I talk about a lot of the strategies that I teach doctors in it. There's a seven week program in there that everybody watching this will benefit from. I do these things myself, even my children. I talk about a lot of that detox in there as well. And they can go to my website. I've written thousands of articles. And I do a podcast there as well. And that's DrPompa.com. So, DrPompa.com.

**Dr. Mowll:** Dr. Pompa, thanks so much for taking the time.

**Dr. Pompa:** Appreciate you having me. Thank you.
Brian Mowll: Okay, so I'm here with nutritionist Christa Orecchio. And we're going to be talking today about adrenal health. And the connection between adrenal health, stress, and blood sugar. And really how to strengthen the body's resources so that we can combat this. We were talking earlier about how most people are living off of stress hormones. So how does that work?

Christa Orecchio: I know it sounds funny, doesn’t it? “I’m living off of stress hormones?” But my research in the last few years has shown that 80 percent of us are walking around in fight or flight mode. Or we’re spending time in the wrong nervous system. So we’re in mostly what’s called sympathetic dominance.

So we're living in that fight or flight mode where we're constantly secreting adrenaline and cortisol in response to everyday things in life, right?

Not in response to stressors to keep you safe. We should be living in that nervous system only when crazy things are happening, and we need to access this. And what's happening – we're a nation where we love our coffee, and we love our sugar, and we love our alcohol, and we love insane productivity at the cost of self-care.

So we've now flipped. So the branches of the nervous system are also...
flipped, and we can't click over into parasympathetic dominance. Which is rest, digest, and heal. Which is why so many people have digestive problems, adrenal problems, thyroid problems, and to your point, Diabetes, right? Because the adrenals and the thyroid they have this mutual control over your metabolism.

And if you're living in this state for any length of time, what happens is you completely lose the ability to regulate your blood sugar. And your body's trying to compensate and keep you alive like you're stranded on a deserted island, right? By secreting stress hormones. And it forgets how to use carbohydrates healthily.

And so what's happening, like if we were in stress mode and on a deserted island, you're body would go to fat first. It would burn the ketones in the fat, and then it would move to protein and start wasting the muscle to keep you alive. And we're inadvertently forcing our bodies to operate that way. And that takes such a great toll.

**Brian Mowll:** Yeah. So I think most people watching this realize that stress is pervasive. It's inevitable. There's a lot of stress. And we want to make sure that doesn't take a negative toll on the body, though. So how does somebody know if they are living in the wrong nervous system?

**Christa Orecchio:** If you're living in sympathetic dominance, you're going to experience anxiety. You're going to wake up between 1:00 and 4:00 a.m. We can't be a good sleeper if you're having adrenal and thyroid problems. You'll wake up earlier than you want, 5:00 in the morning when your alarm is set for 6:30 with your heart pounding. You are not going to have an appetite because stress hormones are the greatest appetite suppressor in the world.

And so when you wake up, and you're not hungry in the morning. Like a lot of people in this state aren't even hungry until say 11:00 a.m. And they'd rather have a cup of coffee or nothing. And just kind shoulder on. It's almost like they could be nauseous at the idea of eating. And so it's like this crazy whirlpool. And what we have to do is we have to intercept the whirlpool by using food just food as your medicine.

Where you can interrupt this whirlpool by eating more often. Eating metabolic proteins, which are proteins that are very easy for the body to digest — and always eating protein, carb, and fat together, never eating one macronutrient by itself. Those are some really important strategies.

Because when we talk about adrenal fatigue, does that even exist. It's really a problem at the cellular level between the thyroid, the adrenals, the digestive system, and the nervous system. So what we have to do is make sure that we can shuttle glucose, thyroid hormone, and oxygen into the cell. So that we can stoke the fire and give the body something
to create energy from once again.

And this is when we stop oversecreting stress hormones. And we can start burning the nutrition in our food so that we can have energy, start to sleep, and feel calm — all of those good things.

**Brian Mowll:** So there's a lot of people who feel like they gravitate towards intermittent fasting because they're not hungry until noon anyway. So they just don't eat. And from what you're saying, is that could be a sign of some adrenal issues. Or at least they're overproducing these stress hormones. Or in this raw nervous system, so to speak.

**Christa Orecchio:** And we get addicted to feeling like that. “Oh, I’m not hungry.” Or, “I feel great.” Right? But like we are teaching our people as we work with them the difference between living off of your food and living off of stress hormones. Because it's so addictive. Because we all want to feel alive, right? Even if we're doing it at the expense of our long term health.

But that's what's happening in our society in general. Is we're prioritizing short term survival over long term health. And what we're finding, Brian is that someone could have went through something years ago. They went through a divorce. They went through something traumatic. And it was a prolonged period of stress, right? And so, boom, it shifts them. And they start living like this, and then they don't even realize it.

And so it's hard to shift the whirlpool in the beginning. Your body's not used to metabolizing carbohydrates. You love that rush that you get. But you've got to do it if you really want to heal and not continually do damage to the nervous system.

**Brian Mowll:** So how does that type of situation impact weight and blood sugar health?

**Christa Orecchio:** It's case-specific. So there's some people that lose a lot of weight when they're living like this. And then the vast majority of people can't lose weight to save their life, and they start exercising more. And eating less, and they gain more and more weight. Because their thyroid is just saying, “I give up,” right?

We know the thyroid is the metabolic regulator of the body, the furnace, the thermostat. And if it's not getting what it needs, it can't help you. And you get the spare tire from the overproduction of cortisol. And we've got so many people that have done a ketogenic diet for so long, and then they can't move that spare tire because they are living off of stress hormones.

And so the body can't prioritize balance, really. Which is releasing the
excess fat and tissue. So it’s a slippery slope, though. Like we were talking about. Especially with Diabetes, is you have to go slow with your carbs. And the only carbs that we recommend that you eat to try to heal are roots and fruits, right?

And sometimes, using those two together strategically are really amazing to meet the needs of the cell. Roots and fruits, and having a little bit of fat, and having your protein with it altogether. We really overdo it on the fat. Especially in the Paleo community and all of that. We overdo it on fat. It’s so easy, right? Because just a couple of tablespoons of oil.

**Brian Mowll:** It doesn’t take much to go overboard. And especially if people are trying to burn their own fat stores, but their putting in a lot of extra fat. It’s kind of stops you from doing that.

**Christa Orecchio:** Yeah. The key is to use fats strategically. As I’m sure, you coach everyone to do. To slow the release of glucose in the system to create blood sugar stability. And over time what's happening, a lot of people can't convert their inactive thyroid hormone T-4 to T-3 because of this stress hormone response. It's this domino effect. And over time, by eating this way you'll retrain your body to convert that, right?

You'll be able to get thyroid hormone in the cell. When you eat, you'll be able to stoke that fire. And then you don't have to worry about your weight. Underweight, overweight. Because your body can regulate it on its own.

**Brian Mowll:** Interesting. So if somebody recognizes this, they're listening to this right now, thinking, “Yeah, that’s me.” What are some strategies they can use to start to kind of check back in with their adrenal health, maybe even their gut health, and start to create some balance?

**Christa Orecchio:** Well, I would definitely say if you're having trouble sleeping, have a nighttime snack. That goes against what a lot of other people say. But we have to regulate blood sugar at night. If you’re waking up between 1:00 and 4:00 a.m., or your heart's pounding. You're hungry, and what's happening is you're having a cortisol surge.

Because we all have reserves, right? We should have reserves in our liver, and in our muscle tissue of glycogen. So if you skip a meal, no big deal, your body releases that, and you can keep your blood sugar stable.

The problem is we've been living in fight or flight for so long we have no reserves. That's like you do not have a generator if the power goes out. So the body has no choice but to say, “Well, give him stress hormone. There’s no other fuel available,” right?
So have a snack at night. And we have our people having golden milk, which is great for the GI tract, great for inflammation. So golden milk with some coconut oil, and some collagen, a little bit of ghee, cinnamon. You've got protein, carb, and fat. Or half a banana with pink salt. And about ten cashews.

Will really do the trick. Help you produce more serotonin, give you Vitamin B6 for progesterone production. And keep you sleeping through the night. I actually have my whole neighborhood on this, we have a salty banana snack before bed.

So that's something, and then you've been fasting all night. So I'm not a fan of intermittent fasting. If you're in this situation, it's really one of the worst things you can do to keep yourself locked in this whirlpool that you want to get out of. So you have to eat within 30 minutes of waking up: protein, carb, and fat.

People who aren't hungry we'll have them do bone broth and crack an egg in it while it's cooking, and have a piece of fruit with that like a really simple breakfast. Or if you can handle, you do some yogurt. A cup of yogurt, coconut yogurt, or sheep or goat milk's yogurt with about a half a cup of fruit. Or depending upon how much fruit. Where if you weren't eating it you're going to less. Some cinnamon to stabilize blood sugar.

**Brian Mowll:** Yeah. I think that's really good advice. A lot of people see a really sharp rise in their blood sugar in the morning; it's called the Dawn Phenomenon. So they try to figure that out. And one of the things they try to do is not eat. And the blood sugar keeps going up, typically. So, yeah, actually getting some food in. Kind of kickstarting that hormonal regulation of blood sugar is actually a really good solution for that.

**Christa Orecchio:** Yeah. Especially if you have Diabetes, I mean it's got to be within 30 minutes of waking. And we also recommend – we've have a program on this. The adrenal recode, and we call it the recode morning elixir. And they have the juice of half of a lemon, some ginger for hydrochloric acid, and we use raw honey because it's very helpful to healing myelin. The electrical insulator of the neuro cells. But also we want to refill those glycogen stores as soon as you get up.

I don't know how you feel about that with Diabetes. But if you do that and you add some salt in there, because you need the mineral. Especially people with adrenal fatigue get lightheaded upon standing or waking up. So that will anchor you. And 30 minutes later you have something to eat.

Your whole day will go different. Like you can get out of this cycle within a couple of weeks with changing your routine.
Brian Mowll: I was just interviewing Vincent Pedre, who was talking about the Hadza people and how they eat raw honey as one of the five staples of their diet. But they actually eat the honey with the honeycomb and the larva inside. It’s interesting. So they actually get some healthy fat and protein from the larva with the honey.

Christa Orecchio: So they’re getting a complete balanced. Raw honey is really a magical substance.

Brian Mowll: Yeah. Pretty interesting. So when we look at gut health, because I know this is another passion of yours. And I think really important for people with blood sugar issues. This could be obviously a two-hour talk in and of itself. But what some of the key things to focus on for someone to start to work on bringing balance back to the gut, or healing the gut?

Christa Orecchio: Well, definitely number one is to slash inflammation. So doing something like golden milk and starting to eliminate the things that don’t work for you. Gluten is a destroyer. Sugar’s proinflammatory. The white stuff, not the good sugars from fruit and roots.

And so definitely making sure that you’re going to get rid of inflammation. But this is definitely a two-hour conversation. How many antibiotics have you been on throughout your life? Because if that’s the case you do need to do a gut repair plan, right?

Just like we change the oil in our cars, we’ve got to think about healing and sealing the gut on a regular basis. Back to stress, cortisol thins the lining of the gut. And so, the more stressed we are, right? And that’s why we call it a nervous gut. Instantly. You feel it in your gut, and it starts to kill the good bacteria.

So the steps go, slash inflammation, get rid of any pathogens, or at least flip the pathogenic code. And you can do that with your diet with herbs, and spices, and a healthy diet. And then you want to make sure you have enough of your good bugs. And enough hydrochloric acid to prevent future invasions. Are kind of the steps to make sure you have good gut health.

But the idea is, as I’ve always said, Brian, you’ve probably heard me say this a million times. All disease begins in the gut. And Hippocrates, the father of natural medicine, said that 3,000 years ago. But throughout this research, no actually all disease begins in the nervous system. Because if you have a rock-solid strong nervous system, you will be so much less susceptible to get these gut infections, right.

You will be so much less susceptible you’ll be able to maintain strong digestion. It’s the foundation. As soon as it starts to shake, whatever
you're genetic weakness is; immunity, whether thyroid, whether it's the gut – then it starts to crumble, right? From there. I’m realizing just how very important it is to focus on this.

**Brian Mowll:** Do you have any favorite healing strategies or kind of restoration strategies for kind of bringing that natural vitality back to the body? Things like meditation, or journaling, or walking, is there anything that you really love there?

**Christa Orecchio:** Yeah. We are talking about this whole emotional patterning part of our program. Because we have to learn to respond to life instead of react to it. So you find something, whatever’s your pressure valve relief. For me personally, it’s yoga. But yoga is studied. It’s clinically proven that by doing the certain stretches, right, you’re actually getting the cerebral spinal fluid to nourish the nerves. And so by doing forward bends, things like that. You can start off in sympathetic dominance. You can take a gentle yoga class and end in parasympathetic dominance, which is where you want to be.

And foam rolling is also amazing for this. I don’t know if you’ve tried it. Full-body foam rolling, but especially in the hips and the psoas especially because we sit a lot. But they say that’s the junk drawers of our emotional storage, and it’s like, hey, life can be a lot, and we still have to operate our responsibilities. And if we can’t process it we store it within the body. And so you’ve got to find a way to release these trapped negative emotions. So that when future stressors happen you are responding in the present moment, not out of this major trigger from the past.

So that stuff is so key. Because you can do all of the healing work in the world with your food, or with supplements, but then the next time a major life stressor comes or even a little stressor –you’re going to go back into that. And so this is where sometimes the clinical can even be a band-aid unless you do the work you need to do to remain grounded in the eye of the storm.

**Brian Mowll:** And these are so important because when we look at blood sugar problems, it's not just always eating too much sugar, or eating the wrong foods, or even not exercising enough. There’s other factors. And gut health is one of them. Adrenal health. Hormone balance. These are all really important. So Christa Orecchio thank you for being here and sharing this.

**Christa Orecchio:** It’s my pleasure. Thanks for having me.

**Brian Mowll:** You’re welcome. You have a couple of great programs: the Adrenal Recode Program and your gut program, Gut Thrive and Five. So if people want to find out more about those do a deeper dive how do
they get that information?

**Christa Orecchio:** Well if you’re interested in gut health, gutthrive.com, you can find out everything and the strategy. Andtheadrenalrecode.com is the nervous system work.

**Brian Mowll:** Okay. Great. And your website?

**Christa Orecchio:** thewholejourney.com if you want to watch a whole bunch of shows about this.

**Brian Mowll:** Thank you, Christa.

**Christa Orecchio:** Thanks, Brian.
Brian Mowll: Hi. So I'm here with registered dietitian Cassie Bjork. And I've known you a long time, and have had you on some Diabetes summits before. And I love your perspective on diet and nutrition. I think it's very refreshing. And I think it works, which is the important thing. So can you maybe in a nutshell talk about where you've come from as an initially licensed registered dietitian and sort of your journey and what you teach now when it comes to food and lifestyle?

Cassie Bjork: Yeah. Thank you. I think the reason that our approach works is because we're viewing the body as a whole. And most dietitians are still teaching the eat less, exercise more, calorie restrictive approach to metabolism and weight loss.

And that can work short term, but it doesn't work long term. I think that's why my approach has worked over the last decade. Is because we're looking at all of the pieces of the puzzle, so to speak. These all like the chapters in my book. Like supplements and stress, and sleep, and thyroids, and hormones. And yes, exercise and yes, food.

We can't just look at those two factors when it comes to the whole-body approach. We have to take that whole-body approach to really get the lasting results that people are seeking.

So it's very different than when I was in school. Everything that I learned
in school to a registered licensed dietitian. And I'm glad that you brought that up, because I think it can be so confusing for people when dietitians are still teaching the low-fact, low-calorie approach for weight loss. It's crazy. Even to this day the dietitians that I hire are coming from this training, this conventional training of following all of these old dieting rules and restricting the body. When really, in fact, you know, and this is why I think our approaches align so well. Is that we have to be eating real whole foods and stabilize the blood sugars in order for the whole body to work how it should.

**Brian Mowll:** It does seem like there are more dietitians kind of bucking the system. Waking up and teaching something different. And we're even seeing the dietary guidelines change a little bit, but they change so slowly. And then that information's got to filter down through the schools and so forth. Things don't move very quickly. So it's people like you that are really getting out there and sort of taking charge, sharing this information with other dietitians. And other people. What gave you that inspiration to do that?

**Cassie Bjork:** For me, I learned everything that I was learning in school. And I was practicing all of these rules that I was learning. Practicing what I was learning and preaching. So I, myself, was eating low-fat and low-calorie. And what was crazy to me at the time, was that I started to gain weight. And this was when I was in school to become a dietitian, to become the expert in all things nutrition and metabolism.

And it wasn't just like two pounds or five pounds. It was ten, fifteen, twenty pounds. This was as I'm learning and applying all of these approaches that I thought were supposed to working, to my own life. And I was just so confused and so frustrated.

And that's when I really decided to look into the research and figure out what the science was actually showing. I'll never forget either. I walked into my first annual nutrition and dietitian conference, and I saw this huge tent sponsored by Pepsi. They were sponsoring a calorie-counting campaign.

I was like, “Why would Pepsi be at this annual conference for dietitians?” Like this is where we get our continuing education credits. And then I saw McDonald's, and then I saw Splenda. That's when it all clicked to me that maybe my education isn't just based on science.

The intertwining between the big food companies and the governing boards is really, really frightening. And that's when I started to really dive into the research. And see that a lot of the government's recommendations, as you know – recommendations for nutrition and dietary guidelines are based on science. In fact you have to follow the money.
Brian Mowll: Based on sponsorships. And everybody has an interest in the guidelines.

Cassie Bjork: Everybody does have an interest in the guidelines. That’s why this whole, low-fat, low-calorie thing happened. And that’s why we’ve blaming the wrong villain. We’ve blaming fat when really we should be blaming sugar for the results of the increased prevalence of Type II Diabetes, and heart disease, and obesity.

But it all started back in the 1960s. There was a single study funded by the Sugar Research Foundation, anonymously funded. And it proved that fat caused heart disease. And they said sugar had zero to little effect.

And it was contrary to all other reputable research. And it was completely bogus. And the government knew this. Like the federal officials knew that it was flawed, yet they use this as a basis for policy. And you have to think like, “Why would they do that?”

I always think when something doesn’t click, you have to follow the money. So this ties into my story because I was seeing all of this. The system is just so backwards. I’m following all of these dieting rules, and I’m getting heavier. And at the same time, I’ll never forget.

It was my last year of school to be a dietitian, and I got this call from my mom. And it was about my dad, and he was running a race at the time in my home town, in White Bear Lake, Minnesota. And instead of sailing across the finish line he walked gripping his chest. And he was rushed into immediate, unexpected heart surgery.

And I was like, “What? My dad’s like the healthiest guy I know.” He was only 47-years-old at the time. He didn’t drink. He didn’t smoke. He ate just like I did. Low-fat, low-calorie diet. Really, really clean. He was running a race for Christ’s sake when he ends up on the operating table.

I will never forget I was sitting in the room with him after the surgery, and the dietitian walked in. I was all excited. I was like I’m not going to tell her I’m in school to be a dietitian. Because let’s just see what this expert has to say. Because clearly, what I’m doing isn’t working. What my dad’s doing is not working.

And she looked at him, and she said, “So you want to make sure you maintain a low-fat, low-calorie diet. Make sure you have oatmeal every morning with skim milk. A glass of oranges juice. Don’t ever look at a stick of butter again; only use margarine.”

And I’m like he’s already – five to nine servings of whole grains. Whole grain pasta. All of the carbs, stay away from fat. Eat low-calorie. I’m like
he's already doing all of these things. I was doing all of those things too. And she's like, “Okay, great. Keep doing them.”

And that was such a wake-up call for me. I'm like, okay, I'm fatter, my dad's sicker, and we're already doing all of this. Something's not adding up. So that's when I really started to dive into the research. And I found that all of this, I was dumbstruck by all of the information that I discovered.

Like maybe cholesterol really isn't the villain we thought it was. It's actually an essential nutrient. Like maybe higher fat diets are actually more beneficial than high carb diets, because of how they regulate blood sugar and insulin.

And that's when I also discovered there's so much more to metabolism than just food and exercise. We've got to look at all of the pieces of the puzzle. Your stress levels, your hormonal levels, and your thyroid functions. What supplements are you taking? And are you sleeping? The whole picture.

So that's when I really started to apply these findings in my own life. As I questioned, why is the basis of the government's recommendation carbohydrates? And if all of that's supposed to work, why does it seem to be backfiring? Like why is our nation getting sicker and fatter? It doesn't make sense.

So I became a rule breaker. And I quit the low-fat, low-calorie diet. I started to eat more. I'd been running marathons trying to burn calories to lose weight. Instead I was just gaining weight. So I just stopped all of that. And I started eating whole real foods. And I started taking care of my body by doing the right types of exercise and eating more fat.

My cravings disappeared. My energy levels went up. I lost 20 pounds, and it stayed off. And I've never looked back. And I felt more like myself again. I didn't know what was happening at the time. Now I know that inflammation was being reduced, and my hormones were balancing out.

And all of that research and my experience became the basis, the foundation for our rule breakers weight loss coaching program. Which looks at all of the pieces of the puzzle. Now we've been doing that for a decade, and we've seen hundreds of women and men go through our program, and they've tapped into new levels of energy. And they've lost weight that they never thought they were going to be able to lose.

And people with Type II Diabetes have come off of medications that they were told was going to have to increase for the rest of their life. Weight that they were told was just because of genetics or age; they've lost.
These are things that people think that will never happen that are totally possible. We can rewrite our stories, we just have to break free of these habits, and this brainwashing that's happened. As a result of the big food industry, and our governing boards. And the sponsorships and all of the shady, messy, intertwining's that happen.

**Brian Mowll:** Yeah. And people know. One of the things I love about your message is it's based on common sense, really. And people go to their hospital-based dietitian oftentimes. They leave with advice that they know that this just doesn't seem right.

**Cassie Bjork:** It feels a little sketchy. You kind of get that feeling, and it doesn't really make sense.

**Brian Mowll:** Right. And I also love the fact that you said it's not just food. There's so many factors, including exercise. With stress and sleep. Gut health, and hormone balance, and all of the things that you mentioned.

**Cassie Bjork:** Well, that's what I love about your approach. Is that even for Type II Diabetes or just being healthy in general. We have to look at the big picture. Yes, food is important, absolutely, we want to look at food.

But we have to look at all of the factors involved in who we are, and our biochemistry, and our lifestyle, and our bodies. In order to get real results.

**Brian Mowll:** So, with all of that information, it's probably no surprise, but you recently decided to give up your license as a dietitian. You're still a registered dietitian but as a licensed dietitian. Why did you do that?

**Cassie Bjork:** It's such a good segway because really, this is why the Board of Nutrition and Dietetics came after me. Is because they only wanted me to talk about low-calorie, low-fat food. So just a few years into my career, as I was seeing these amazing results with this program that I created based on actual science; but not based on what I learned in dietitian school. They didn't want me talking about any of that.

It really didn't matter what results I got with clients. They wanted me to follow the conventional, traditional dieting rules. The very rules that made my dad sicker and me heavier.

So it left me at a fork in the road. I could either keep teaching what I was teaching, what I knew helped people. What transformed my life and my dad’s, and now hundreds of people that were going through our programs. What was really aligned and what I knew to be true. And the research was showing to be true.
Or I could change the way I teach. And I could teach their food rules that never worked for me or anyone else. To be clear, I actually fought for five and a half years. I fought this battle against the board. And we’re talking lawyer, lawyer fees, court dates, mediation, interrogation, the works. And I did that because I do really value my education and credentials. And I respected those credentials and the authority that I thought they gave me.

But when it came down to it, it just wasn’t aligned with what I had seen to be true. And I’d rather get results than spew out information from dusty old textbooks that doesn’t help anyone. So that’s what it really came down to. Is the reason why we get such great results in my coaching program is because we bucked the very rules of traditional dietitian training.

And because of that, because I’m a rule breaker, and my program is called rule breakers, because we are breaking these dieting rules. That’s why they came after me. So last year I decided to just kiss that license goodbye. It feels so good. Because I’m helping people, and my mission. Ever since hanging my shingle as a licensed dietitian, my mission remains the same.

I still get to help people break free of these old patterns and this brainwashing. And bring it back to the basics. Like you were saying, the common sense. If we’re going to restrict our calories and deprive our bodies of what it needs – of course we’re not going to feel good. And our metabolism is going to slow down. Our body’s going to conserve and compensate.

But when we give our body real whole foods, and plenty of rest, and plenty of sleep, and we take good high-quality supplements, and we’re drinking plenty of water and doing exercise. But not too much, so we’re stressed. But just enough where we’re moving our body in healthy way. Then you’re going to feel great. I love that I get to share that. I’m proud of myself for not just giving in to what they wanted me to teach just to follow the rules.

**Brian Mowll:** The only downside is you’re not breaking as many rules now.

**Cassie Bjork:** I know. And I like breaking rules. That’s why I have blue in my hair. I’ve got to break a few of them.

**Brian Mowll:** So, I know you have a line of incredible supplements as well. What are maybe one or two of your favorite supplements that you get to share with your clients?

**Cassie Bjork:** Well, my personal favorite, because I struggle with a sugar
addiction. As I know, a lot of people do just getting those compelling sugar cravings. You can eat perfectly healthy, and your blood sugars can even be balanced, and you can still crave sugar.

You know this and a lot of people have experienced this. So Pure GlutaCaps is one that I formulated that has a really potent amount of glutamine. What I love about glutamine, not only is it the most abundant amino acid in the body. So it’s like the most natural supplement that you can take. But it’s actually responsible for producing those brain chemicals that determine whether or not we get physical sugar cravings.

So what I love about this is it’s like a great first step to taking away sugar cravings. And what’s interesting, Brian, oftentimes, we will find that people will still have the emotional and the habitual craving. And then we deal with that in other ways, whether it’s just the journaling and figuring out why the craving is actually happening in the first place.

When you can take away the physical craving, it’s a great first step. And what I also love about glutamine, it works kind of two-fold. It can take away sugar cravings. It can prevent them and bust them when you have. And it can also heal inflammation. So even for people who don’t get sugar cravings we still recommend that they take Pure GlutaCaps because it can help reduce inflammation.

And we know that inflammation is the foundation of probably heart disease, and cancer, and just so many issues we have. Definitely Type II Diabetes. And weight gain. And the problem is you may have this inflammation that you don’t know about. We can’t see it or feel it. But our body will allocate all of its resources to trying to heal it. So that’s why if we have inflammation it can be almost impossible to lose weight or even have great energy levels. Because your body is just trying to heal it. So if we can help our body heal it and take away sugar cravings in the process, why not? So that’s why Pure GlutaCaps is my favorite supplement.

Brian Mowll: All right, registered dietitian Cassi Bjork, thank you so much. If people want to find out more about the supplement line that you have, or your rule breakers program, where do they go for that?

Cassie Bjork: Yeah, cassie.net is where everything’s at. That’s where the party starts. The rule breaking happens.

Brian Mowll: All right, thanks for spending some time with me.

Cassie Bjork: Thank you so much.
Brian Mowll: Okay, so I'm here with Dr. Brett Scher, who is a low-carb cardiologist and practices in San Diego. And would love to talk to you today about the connection between Diabetes and blood sugar, and heart disease, and cardiovascular health in general. And then really whole-body health. Because of course that's what most people are after.

So you talk about low-carb diet, and obviously feel this is valuable for people with metabolic health, and maybe just in general. How did you come to that type of understanding?

Dr. Brett Scher: That's a great question, Brian, and thanks for having me on. As a cardiologist, look I spent 14 years in college, in medical school, and residency, and fellowship. And with that type of commitment, I thought I was going to be able to change the world. And just change people's lives dramatically by preventing heart disease.

And then when you get into the reality of things, I sort of realized I wasn't having the impact that I thought I was. And at first I wasn't sure why. And I wanted to focus so much more on prevention. Because the cases I was seeing in the hospital, time, and time again, I knew it could be prevented.

And the overwhelming majority of them had some blood sugar issues. And I didn't quite connect the dots at that point. So I started a health
coaching business. And the health coach I was working with he was very much into ketogenic diets. And at first, I was resistant to his suggestions. But then once I started giving in and instituting, just experimenting with some of the patients. And I saw the amazing improvements. Then I had to go back and do sort of a deeper dive into the literature. Into the science.

And that was the eye-opening moment for me to realize that the foundation of science on which I had been taught. The low-fat, eat less, move more, the foundation of science is so faulty. And the strength of the evidence doesn't support the strength of the conviction of the teaching.

And that's when I realized low-carb was this untapped universe. Basically, that was potentially so effective for so many patients. But was not talked about in the medical community. And once I started to get experience with it with my clients. There was no turning back. Because then that's when I started to see the impact I wanted to have. And incorporating that. And here's the key that I think, is that incorporating that into an overall healthy lifestyle, right?

You still have to talk about sleep, you still have to talk about stress, you still have to talk about moving your body, and physical activity. You still have to talk about mental wellness. But if you can combine all of that, and then with a healthy low-carb lifestyle, patients thrive.

They feel better. Their blood sugar improves. Their insulin improves. Their weight goes away. Their energy improves. And that's what I wanted. That's why I spent all of those years becoming a cardiologist. So I can have that kind of impact on people.

Brian Mowll: Wow. That's amazing. It's amazing. I've known a lot of cardiologists. I think there is a huge desire to use lifestyle. Because you see the value of it to want to help the patients prevent heart disease. Prevent a future heart event, if they've already had one, or stroke, or other vascular disease.

But there is one thing that seems to be almost like a sacred cow in cardiology, which is the lipid profiles. And the use of statin medications to reduce LDL cholesterol, and total cholesterol, and so forth. How do you see this? Is there some concern about low-carb, high-fat, ketogenic diet can drive that up? Is that a problem? And how does all of that fit in?

Dr. Brett Scher: Well, look, Brian, you said cardiologists want to use lifestyle to improve people's lives. But in reality our system isn't set up for that, and that's part of the problem.

Our system is set up for writing prescriptions to get quick results in the
minimal time required interaction. There's lots of reasons for that. It might work for a system trying to help hundreds of millions of people.

But how does that system work for the individual person in front of you? And that's where I see the biggest challenge. That's a big reason why prescription medications are such an important of medicine. And to be honest, that's why I started this health coaching business, right? Because I wanted to break free from that model. To really work with people on a deeper basis.

So taking that then to the next step, saying, okay, well, if the prescriptions are the easy things to do – is it still the correct thing to do, though? Because cholesterol and lipids are associated with increased cardiovascular risk. I think the studies are fairly clear. There is an association. In a general population, and people following a low-fat or standard American diet. That association is true to a degree.

But then the bigger question is, how do you individualize that. Because right now our guidelines and our recommendations are a bit of a shotgun approach. Let's just treat as many people who meet a minimal risk standard, and a small percentage of them are likely going to see the benefits. But that's okay because we're going to make sure we capture as many of those people as possible.

I think about it from a different perspective. My perspective is I don't want to give medications to people to put them at risk for side effects if they are not going to get the benefit. So let's fine-tune that risk assessment even greater. To try and find the people who are really going to benefit.

In a low-carb world, that is confusing. I'm going to be perfectly honest, right? That's very confusing because lipids aren't the only risk factor. Inflammation, Diabetes or insulin resistance, or metabolic syndrome. Triglycerides in HDL as part of the lipid profile, size, and density of the LDL.

All of these things factor into your overall cardiovascular risk. So if you can do an intervention that helps every single one of those, except for LDL. How do you weigh that balance? And that's an unchartered territory right now in medicine.

But that's where I find the most satisfaction in working with my clients. Because you really do need to individualize this. Based on what is your opinion? What are your goals? What's your overall thought about medications and lifestyle? And then factor in all of those health markers, right? And that's how you make a meaningful change in someone's life. A change that they're comfortable with and that they are going to maintain. And that they're confident it's going help them live a better life, right?
No one cares what your LDL is. Your life is no different because of your LDL. You care if you feel better, if you’re happier, if you’re accomplishing more, and if you’re going to live a longer and healthier life. And that’s sort of the overall picture.

The other part of that though is this concept that, oh, if I go on a low-carb diet by LDL is going to go up. And actually if you look at the literature, you look at the science, it is a small percentage of people.

But then the question is what to do in that small percentage of people? So I absolutely think it should be an option for everybody. Low-carb living should be an option for everybody. And then you see what kind of response you have. And if your LDL goes up, you’re not feeling any better. Your Diabetes didn’t improve. You’re not losing the weight.

Okay, that’s sort of an easy decision. If everything else improves, then it comes down to making that decision about the LDL, and it's not a knee-jerk reaction for a statin prescription.

**Brian Mowll:** That makes sense. Some people are concerned with statin medications, concerned to go on statin medications because there has been risk demonstrated for worsening Diabetes or actually instigating Diabetes. Could you talk a little bit about that?

**Dr. Brett Scher:** Yeah. It’s a fascinating concept. Because here is a medication that is supposed to lower your cardiovascular risk. And in some people, it clearly does lower their cardiovascular risk. Yet at the same time it can increase one of the biggest risk factors for heart disease, which is Diabetes.

How do you balance that? It’s a confusing concept. So the literature suggests that it can accelerate the onset of Diabetes in people who are already at risk for that, particularly in women.

The percentages are sort of all over the map in terms of how often it happens. Some will say it’s one in ten thousand. Some will say it’s one in ten, right? And it depends on the literature, and it depends upon the person’s baseline risk. But it’s clear there’s an increase association with Diabetes.

So from my perspective, if you need to take a statin, is statin is indicated for a secondary prevention for high-risk primary prevention. And it makes sense in your overall health perspective, your overall health picture. And you need to take a statin. I think standard of care should be using a low-carb diet with a statin, so you’re doing everything possible to decrease that incidence of Diabetes or that insulin resistance that comes along with a statin medication.
Certainly, if you’re on a statin, you don’t just follow your lipid profile. You need to pay more attention to your A1C. Probably your fasting insulin to markers of insulin resistance. Because if you see that changing, then you need to re-evaluate the risk-benefit ratio of taking that statin.

Because everything’s a balance. Risk versus benefit. And if you see that you’re getting worsening insulin resistance or marching towards Diabetes on that statin, all of that of a sudden that risk-benefit ratio scale is tipping. So definitely something we need to be aware of. And I think something we can treat and hopefully prevent with low-carb lifestyle.

**Brian Mowll:** So last thing I want to talk to you about. You treat your patients from a functional medicine perspective. Which means you’re really going to look for the root cause. And you’re going to look at their whole life. It’s not just about putting them on a certain diet. So can you talk a little bit about that, and specifically for people who are on this continuum of metabolic dysfunction, Diabetes, pre-diabetes, and so forth?

**Dr. Brett Scher:** That’s one of the things that I think is so important. That is under-appreciated in medicine. And that’s why I went to get extra training in functional medicine. And extra training in nutrition and personal training, and behavioral change. Because all of these things are interrelated.

Look, we all know how we feel after a terrible night’s sleep. We’re cranky. We’re grumpy. We’re not maybe thinking as clearly. And we’re having cravings, and we’re hungrier. I know it. As a cardiologist, unfortunately, I still have too many sleepless nights on call in the hospital. And the next day, my workouts stink, and I’m craving carbohydrates.

So there’s interrelationship that we have to be aware of. And we can’t always make it go away, but if at least we are aware of it. We see how our sleep impacts the rest of our health. Our dietary changes, our exercise changes.

The other concept is, though, the better we feel sort of the more we want to take care of ourselves. So I know on day that I slept well, and I had a great workout, I am spot on the rest of the day with my health and my fitness and taking care of myself. And I see this in my clients too.

And there’s sort of a lot of education that has to happen. With my clients that I see with a consult, or I work within my six-month program, that’s a big part of the education I want them to get. To understand this feeling of, huh, when I feel better, I'm taking better care of myself. When I'm taking better care of myself, I feel better. And it's cyclical and it compounds.
And then you're more productive at work. Then you are happier with your family. You're not snapping as much. You're not as reactive. The tide elevates for all aspects of your life. And that's what we want, right? I don't care if your blood pressure's great, and your LDL is great, but you're miserable, and you're hungry, and you're cranky, and you're not productive. What kind of life is that? So it's really focusing everything to figure out all of these factors play together to really elevate your life and your health.

**Brian Mowll:** Dr. Brett Scher, thank you so much for being here with me. If people want to find out more about you and your programs that you offer, what's the best place for them to do that?

**Dr. Brett Scher:** Thanks for asking, lowcarbcardiologist.com is the best place to go. I've got a blog, and I do the Diet Doctor Podcast. Which is also posted on there. And then there's information about my one on one consulting and the membership program.

**Brian Mowll:** Thank you so much for spending this time with us.

**Dr. Brett Scher:** A pleasure.
Dr. Mowll: All right. So I'm here with Dr. Jody Stanislaw, good friend of mine, who not only I think the best, really, at helping people with type one diabetes -- also, you have type one diabetes yourself. So I'd love to talk about that today. And really, I think that there's a lot of mismanagement of diabetes in general, type one, specifically, around insulin, around diet, around monitoring, around really everything having to do with a disease. So perhaps, you could talk about that a little bit, and maybe shed some light on how we can do better.

Dr. Stanislaw: Yes, I'd love too. I was diagnosed in 1980. So I've lived with type one for almost 40 years. So I've seen a lot through these 40 years. And unfortunately, we would think that management would be much more advanced than it is now. The reality is most type ones, truly, have not received the education they need to be in good care.

And unfortunately, that word “I'm compliant” is thrown around a lot, which I think is very unfortunate. Because the reality is, they really are not given the education they need. So when I help patients, I've created a virtual practice. So I help patients around the world. And my absolute mission is to get my online course to as many type ones as I can.

Most type ones learn that they need one unit of insulin for 15 grams of carb. And that's kind of all they learned about how to dose for their meals, which is very short sighted. Because there's different, you know,
species of carbs, glycemic index, if they digest slowly, quickly and protein affects your dose, fat effects your dose. How much foods you’re eating affects your dose, timing of day affects your dose, how active or inactive you’ve been affect your dose, if you’ve been sick, if you’ve been stressed, if you don’t get enough sleep. There’s 10 more variables I just rolled off, you know, my tongue, and yet they learn. Okay, just count your carbs and take one unit for every 10 carbs, or 15 carbs or something.

So all our patients come to me and they will say, “I’m not even going to try. I’ve given up because even when I tried, I couldn’t get good numbers.” And the reality is, they just know this much. And I think the breakdown is truly that type one is such a complex disease, but yet not that prevalent, to be honest. I mean, compared to type two, we’re maybe 5% of the diabetes population.

So there’s millions of type twos out there. But you know, every now and then an endosepsis, is a type one. And they go, well. Well, I know this, because I’ve lived it, I've experimented on myself. And so that’s really the problem, is that good education is not given to the type ones because the physicians themselves probably are not that comfortable with it.

I was asked what textbook there was for type one when I went through medical school, and I said, “Well, there isn't one.” There are type one books that are written by medical professionals with type one. And those are the same books that I recommend to patients as well as physicians.

Now, I encourage people to take my course because I’ve done you know, there’s five hours of videos and handouts that I think is the most comprehensive training for how to have a healthy life with type one. So I mentioned just the mealtime dosing, but that doesn't even bring up the fact that we also have basal dosing, the background dosing, and that’s another whole training series on how to do that.

And most patients have no idea what why they’re even on that insulin, like I thought I only need insulin when I eat. And they don’t even know why they have to take a long-acting, or people don’t know the difference of pump versus long-acting. Somebody asked me the other day, “Did you hear that they put fast-acting in pumps now?” And I was like, “It’s always how it has been.” Because they don’t know. Yeah. I had one patient who corrected her high at night with long-acting. And I said, “Well, why did you do that?” And she said, “Well, I was told only to take long-acting at night.”

**Dr. Mowll:** So these are very common mistakes that a lot of people watching this potentially are making, because they're not really getting the best advice from their physicians, or their diabetes educators, certainly not dietitians, and things like that. So they really need a better
programming on how to do this. You mentioned a couple, but what are the most common mistakes that you see people making when they come into your program or have a consultation with you?

**Dr. Stanislaw:** To be honest, if you’re eating high carb, you’re not going to get good numbers. I’m sorry, it’s not going to work. So the conventional medicine, what they teach is that you can eat anything you want and take more insulin. And they even do this at diabetes camps and diabetes events, you’ll see bagels and crackers and cookies.

And it’s not possible, because it’s that hard to get your mealtime dose correct. And the reality is, if you eat a ton of carbs, you’re probably going to shoot super high. And then you have to give a dangerously high dose of insulin that you pray hits when you actually need it and not before or after, because then you have a devastating higher low if it hits at the wrong time.

So timing of rapid insulin is incredibly complex. And it’s not as simple as I’m eating 100 carbs, I’m going to take 10 units of insulin, so you’ve got to eat low carb. And yet, eating disorders are also very high in type one. So I am very sensitive to helping my patients find a diet that works for them that’s not restrictive, which I also think is something that’s really left out a lot. So I dealt with an eating disorder myself, I was in an eating disorder rehab center for two months. I mean, I weighed and measured every single bite of food I ate since the age of seven, until I was in college. So I started rebelling in my teen. So I’m very cautious when I give dietary recommendations, but I’m very firm that if you want good numbers, low carb has to go, has to be.

Number two is how to exercise without going low. Most patients don’t know how, because all we’ve been told is you got to eat more. And I was a teen stuffing my face every day at soccer practice. And I never knew that, actually, you don’t have to do that. I can exercise and not eat anything now.

And that is a miracle and nobody knows that. Some people don’t even exercise at all, because they’re afraid of going low, which is a tragedy. So those are two big ones that are first from the beginning. I say okay, this is what we’re going to go over; knowing how to set your basal rate. Reasons for temporary basal rate increases and decreases, people don’t ever think about that.

**Dr. Mowll:** Now most people with type one know what a basal rate is. But for those watching who don’t, could you explain that a little bit more?

**Dr. Stanislaw:** Sure. Basal rate is actually a term that refers specifically to somebody on an insulin pump. But basal rate, I could also
interchangeably use that word with long-acting insulin. So Basal, as in baseline, is the insulin that a type one needs in their body 24 hours a day regardless of food. The liver is always putting glucose into the bloodstream to counteract that, we need the baseline or basal. Without insulin, if I didn't eat all day and didn't take insulin either, I would go into diabetic ketoacidosis. The body must have insulin every day regardless of food.

**Dr. Mowll:** And a lot of people don't realize that the glucose that's in the blood isn't just from the diet; the liver, as you said, releases glucose constantly in the bloodstream. And at some points more than at other times of the day based on the effect of these counter regulatory hormones like glucagon, and cortisol, adrenaline, and so forth. So it's important to realize that it's not just all about your diet; as a type one diabetic, you could not eat at all. But still, if you didn't take insulin, your blood sugar will rise to a very dangerous level.

**Dr. Stanislaw:** And another thing I teach a lot of patients about is called the dawn phenomenon. And cortisol is the stress hormone. But yet cortisol in excess is bad for you. But actually, it has a role 24 hours a day, it has its own cycle. And we need that. And in the morning is when it's at its peak. Well, cortisol, that's what it does, it tells the liver to put glucose out.

So I can wake up with the perfect blood sugar level and double my blood sugar level within an hour of waking up, simply from waking up, because that's when cortisol is at its peak of its natural, non stress induced 24 hour cycle. So people don't understand. People say, “I didn't eat anything, and I'm 200.” I said, “No, that's just your dawn phenomenon.” And I said, “Well, what do you do?” I said, “Well, you're going to have to give some fast-acting.” They're like, wait a minute, I thought I only could give fast-acting when I was eating.

So all these little tools and tips are life changing. I've spent one appointment with patients and they're like, “I learned more from you in one hour than I have in 40 years.” You know, and then so it's my passion to get my training out to the masses.

**Dr. Mowll:** Continuous glucose monitors, they're starting to become more available. Anybody with type one can get one. The people with type two diabetes, hopefully soon, they'll be recommended and available, as well. What do you see is the value of using a CGM?

**Dr. Stanislaw:** I love that question. It is the most powerful tool for good management I've ever seen in 40 years, hands down about the pump. I always say diabetes doesn't kill you, bad blood sugar levels do. And so when you have a CGM, I'm not high anymore for very long because I get instant feedback. It's in my pocket most of the time.
And if it vibrates, I know immediately I know I’m high. I can take either a correction dose or go run around the block, and I take action right away to bring it back down. I also have the most perfect luxury levels overnight than I ever have in my life. I can be 80 for eight hours while I sleep, which is a dream. And it will wake me up if I’m high, it will wake me up if I’m low.

So you get instant -- you get to stay in range. And the second you’re out of range, you’re notified. I mean, I’ve always been a big tester. Before my CGM, I probably tested 10 or 15 times a day. So I still wouldn’t let seven hours go by without testing. But I have had diabetes for 40 years. I only -- Well, first of all, the first two years I didn’t even have glucose testing.

And then the next 30 years, there would be hours and hours that would go by and I’d test and then I’d be 250. I was like, oh, was 250 for the past four hours, and I didn’t know it. And so every moment that you’re high, it’s doing damage to your body. And now part of me is very sad that I didn’t have these 40 years ago, because my body would have been saved from so much damage that has happened. Now luckily, I feel very healthy. And my eyes are great, my feet are great. And I’m 46 with diabetes. You know, so healthy life is possible, but a CGM is one of the best tools.

**Dr. Mowll:** And as you said, there are a lot of things that can affect blood sugar, it’s not just what you’re eating. So you could be fighting off an infection, you could have a dental issue, you could have some other form of inflammation, you could have had a bad night’s sleep, you’re dealing with some sort of stress.

And without that CGM, you may not know that your blood sugar is elevated. So it’s a great tool to have so that you can correct quickly. For someone who has type one diabetes, and they want to be able to manage it well and keep their blood sugar as close to normal, as consistently as possible. What do you think is the sort of the best overall recommendation for them to avoid, or have the best chance of preventing complications or consequences of diabetes?

**Dr. Stanislaw:** It was interesting. Gary Shiner who is a type one and has practice in Pennsylvania, that’s fully for type ones. He states that complications that are actually related to blood sugar is 40%, which is excitingly low, but still significant. So good blood sugar levels are essential. Most non diabetics are between 80 and 120, most all day long; maybe up to 140 after a high glycemic meal. But frankly, I’ve been looking at CGM of non diabetics, and they rarely go above 100. So normal blood sugar levels are 80 to 120, maybe up to 140 for a short period of time, which is not the 80 to 180 that I grew up being told is okay, so that’s absolutely essential.
But the other big 40% in his data is diet lifestyle. Are you happy? Are you healthy? Do you have friends? Do you eat well? Do you sleep? Yeah, so that's really big. And I love working on that with my patients. I don't just talk diabetes, because who wants to do that all day? Even though you and I do, but that's okay because that's our career.

And then of course, genetics, which we can't really -- I mean, there are people that have phenomenal numbers and they get eye bleeds, and there's people that have horrible numbers, and they don't. But the best we can do is the best numbers we have and then really that healthy, optimistic, joyful, happy exercise, sleep, lifestyle.

**Dr. Mowll:** Perfect. Dr. Jody Stanislaw, thank you so much for sharing some time with me here today. If people want to find out more about you and your great coaching program, how can they do that?

**Dr. Stanislaw:** Just please visit www.drjodynd.com. Jody Stanislaw, I'm on Facebook. But my website has an opportunity to sign up for a free intro call with me. My Courses, my membership program, my three-day retreat that I hold in June every year. It's amazing. And away, of course, to sign up for my newsletter.

**Dr. Mowll:** Excellent. Dr. Jody, thank you so much.

**Dr. Stanislaw:** Thanks, Dr. Mowll.
Dr. Brian Mowll: Okay, so I am here with Dr. Benjamin Bikman, a great pleasure. And we've talked before on the podcast, and great to talk again. We are focused really on Diabetes and blood sugar health, but also how ketones can be beneficial in metabolic health. So what are your current thoughts here?

Dr. Ben Bikman: Right. In fact, more than current thoughts, let's talk current data or current research. So the stuff I'm talking about at this meeting that we're at is how ketones are altering how the mitochondria work.

And most will know we refer to the mitochondria as the powerhouse of the cell. That's because that's the main site of action with the production of the chemical, the molecules that actually allow the cell to work. Any of the work that the cell needs to do it's because of the mitochondria producing ATP.

So every time a muscle's contracting and relaxing, for example, the most obvious sign of work. Or the heart beating, or our body breathing. Those actions are mediated because the cell has enough ATP to get that done. So what I'm going to be talking about is how ketones are altering the degree to which the mitochondria are taking in glucose and fat and then making ATP from that.
What we're finding, in general, is that there's two very different or disparate effects with regards to two very different tissues. The ketones are doing one thing in the muscle cells. And a very different thing in the fat cells. So it's not just a universal effect.

And specifically to let the cat out of the bag with regards to my talk tomorrow. At the muscle cell, ketones aren't really changing things very much. The ketones are just a normal fuel the muscle can use. Well, it's doing a few things.

One, the ketones are actually helping muscle cells be more or have a higher degree of viability. So they are little stronger and more resistant to injury. But it also helps the mitochondria go through that process of taking fuel and making this chemical energy in the form of ATP. While making fewer reactive oxygen species.

So oxidative stress goes down in that same process. So it's letting that happen in a bit of a cleaner environment, so to speak. Less pollution, almost, in the form of the oxidative stress.

So other words, still using plenty of carbohydrate and fat to produce plenty of ATP. We call that coupled. Those two processes of breaking down the nutrient and making ATP, that process is coupled. It's linked together very, very well. In the case of the fat cell, what we're seeing is that the fat cell is using glucose and fat for fuel, but it's making relatively less ATP. And so we've uncoupled that process.

But of course, that chemical energy from the nutrients has to go somewhere, and that's going into the production of heat. And so it's kind of like, I make the analogy in my talk of how the mitochondria are sort of like an engine. In where, I drive a 20-year-old five-speed manual Subaru Outback.

So because it's a manual transmission I can be revving, I can have it in neutral, my foot on cutch, but I'm revving the gas. And I can see the RPMs really driving up, but our speed isn't changing. So RPMs is going up, and speed stays low. We uncoupled the burning of the fuel from the actual engine doing the work we want it to do. That's kind of what ketones are doing in the fat cell. The engine is revving, but we're not going anywhere.

In contrast, in the muscle cell, the engine's revving and we're moving. We're getting speed. So the speed is very coupled to the RPMs of the engine. If that makes sense?

**Dr. Brian Mowll:** Yeah. So bottom if someone is following a ketogenic diet or even using exogenous ketones, supply ketones to the muscles and the fat cells, what's sort of the end benefit for overall health and
energy metabolism?

**Dr. Ben Bikman:** Right. Yes. So I call that the metabolic advantage, where ketones are enabling the muscle cell to do their job, maybe even a little better. Because it's still letting you get a lot of work out of the fuel you're using. But in a cleaner way. Less exhaust in the form of reactive oxygen species.

In contrast, the fat cells are wasting energy. And that's not a bad thing because that's just a tissue that's just storing it, especially in our day and age. When there's so much excess energy in people's fat tissue. Everyone has enough fat tissue to spare.

And so the fat cells are burning through more energy than they actually need. And so it's a little less efficient but metabolically somewhat optimal.

**Dr. Brian Mowll:** So efficiency isn't always good when it comes to wanting to lose fat or burn more fat or lose weight?

**Dr. Ben Bikman:** So when people hear some advertisement for some product, “Hey this makes your mitochondria work more efficiently.” That's kind of code word for expect to gain a little weight. Because you don't want your mitochondria to be perfectly efficient because fat cells don't have a very high metabolic rate. They don't have a very high metabolic need.

And so their idling very, very low. But if you can force them to idle the engine a little higher, well, then you're doing it.

**Dr. Brian Mowll:** This makes a lot of sense. Thank you for sharing your insights today.

**Dr. Ben Bikman:** My pleasure, Brian, thank you.

**Dr. Brian Mowll:** Dr. Benjamin Bikman, thanks for people with us. Hey, if people want to find out more about what you're doing, what's a go place for them to go.

**Dr. Ben Bikman:** Yeah. I'm involved in social media. No selfies, I'm not promoting myself, I'm only promoting science. So I'm sharing the latest research from my labs and others. On Twitter and Instagram, where I'm most active. They can find me at benbikmanphd.

**Dr. Brian Mowll:** benbikmanphd. Ben, thank you so much.

**Dr. Ben Bikman:** Thanks, Brian.
Extended Interview
Ari Whitten

**Dr. Brian Mowll:** All right, so I'm here with Ari Whitten, the author of *The Ultimate Guide to Red Light Therapy* and The Energy Blueprint program. And we're going to be talking all about energy today because oftentimes people have diabetes. They're dealing with blood sugar problems. Many times their weight's affected. And one of the most common things that we see is they don't feel great. Their energy's off. And they're not metabolizing fat and sugar properly. So they don't feel all that good. So hopefully we can talk about how to improve those today.

So when you look at energy, metabolism, and how people feel, what's kind of behind that? What causes people to have low energy? Or what causes someone to have sort of an abundance of energy?

**Ari Whitten:** Yeah, it's a huge question. So there's a lot of layers to that answer. I will do my best to sum it up very succinctly. But I'll first say the prevailing paradigms, I think, for context. So on the one hand, the conventional medical model, if they're looking at people with fatigue or chronic fatigue, for the most part their answer is hey, we don't really understand what causes chronic fatigue.

But we have sort of options for symptomatic relief. There's a review published, the most recent one was published in the *American Journal of Family Medicine* just a couple of years ago, which is called *Fatigue, An Overview*. And it's basically a compilation of sort of all the research
and evidence-based practices for dealing with people who have the symptom of fatigue or chronic fatigue syndrome. And essentially, to give you the quick summary, what they say is, we don't really know what causes it.

But we have some options of things that can provide some degree of symptomatic relief. And they say in the article, the top four treatments that they recommend, and really the sort of main four or the only four that they recommend are: antidepressants; recommendation to start an exercise program, so 30 minutes of walking or aerobic activity per day; cognitive behavioral therapy; and then stimulants when needed.

So that's pretty much best of modern medicine for fatigue. I'll also mention, when it comes to blood tests, 95 percent of the time – and this is actually a statistic taken from this literature review – 95 percent of blood tests come back either normal or don't have any findings that translate into any meaningful treatment that alter sort of those main four recommendations I just mentioned. So that's pretty much conventional medicine.

On the other hand, we have holistic and functional medicine, which I would say I'm generally identified with. But I feel on the topic of fatigue, really there's kind of been a mismatch between... or I would say a gap between the focus of most functional medicine practitioners and the evidence. And specifically I mean that in the context of this sort of adrenal fatigue model. There's been this hyper focus on the adrenals and cortisol levels and the HPA axis as playing this enormous role in sort of controlling our energy levels. And sort of the thinking is, hey, if you're experiencing burnout or fatigue, it's your adrenals and your cortisol.

And the basic idea behind the theory is sort of the adrenals are part of our stress response system. And when we are stressed chronically, we tax that system too much. The adrenals get sort of exhausted. And then you get low cortisol. And then that leads to the symptom of fatigue. I have spent a huge amount of time basically analyzing this research, pretty much all of the research that exists, analyzing adrenal function and cortisol levels in connection with fatigue and burnout and chronic fatigue syndrome and the other recognized fatigue syndromes.

And to make a long story short, to summarize many months of my life of digging into this research in a few seconds, basically most of those studies, the vast majority of those studies, show that the vast majority of people with these fatigue syndromes have perfectly normal adrenal function and cortisol levels.

So it's about 70 percent have perfectly normal adrenal function and cortisol levels that's indistinguishable from normal healthy people without fatigue. And then the remainder is roughly split between people
who have slightly lower or slightly higher cortisol levels. To summarize, I think the whole conventional model and really most of the holistic community, I think, is misguided on this topic of fatigue. I think the real answer is, there’s a bunch of layers to this story that are associated with fatigue.

So I think things like circadian rhythm and sleep are a big part of the fatigue story. Those affect various hormones and neurotransmitters that play a role. They also impact insulin resistance and appetite and fat gain and various metabolic processes. There’s also gut health and overall levels of inflammation in the body, toxins.

Both of those things can lead to directly shutting down the mitochondria, which are the energy generators in our cells. So if you have, for example, gut dysbiosis and high gut permeability, and you have lipopolysaccharide chronically leaking into your bloodstream, that is directly toxic to your mitochondria and will shut down your mitochondrial energy production.

So you don’t really need to invoke any sort of complicated theories of exhausting the adrenal glands and altering cortisol levels and then how that impacts blood sugar regulation and therefore that impacts energy levels. You can have gut permeability that is directly leading to immune and inflammatory overactivation and the leakage of toxins into the bloodstream that is directly shutting down energy production at the cellular level, basically telling your mitochondria you need to shift out of energy production mode into defense mode.

And I’ll digress for a moment on that subject, which is there’s been some seminal research just in the last few years showing that mitochondria are not just these sort of mindless energy generators in our cells. But they’re actually playing an integral role as environmental sensors. And they can even, for example, pick up on what’s going on in the environment and then direct signals back to the nucleus of the cell, where our DNA is contained, and control or influence gene expression, what genes get turned on or off.

There’s a paper that came out of a couple of years ago from a researcher at the UCSD medical school, who has a lab for mitochondrial medicine there, called the cell danger response. And basically it’s envisioning a new role for mitochondria as environmental sensors that are determining whether the body goes more into energy mode or defense mode. They’re actually part of the innate immune response.

So as soon as the mitochondria start to pick up on things like oh, there’s lipopolysaccharide from a leaky gut, or there’s toxins like BPA or heavy metals leaking into the blood stream, or there’s an infection present or something like that, a viral or a bacterial infection, the mitochondria are
actually sensing that and then initiating this cell danger response and shifting the body out of energy more into defense mode. And so that fundamental process is what I believe is at the core of this symptom of fatigue.

There's various things that can trigger it: inflammation, immune overactivation, toxins, gut problems, circadian rhythm, and sleep disruption. There's chronic psychological stress. And there's actually some research that just came out in 2018, now showing that psychological stress directly impacts mitochondria. And that basically what this research did is, they asked a bunch of people to give a speech. It was kind of an interesting thing. They asked people to give a speech defending themselves from some imaginary sort of accusation.

So they had people imagine that all of these accusations have been made against them, that they did all these things that they didn't actually do. And now you have to give a five minute speech sort of defending yourself and your honor as a person and your innocence. And then they measured levels of mitochondrial DNA in the bloodstream.

And what they found is that mitochondrial DNA is actually leaking into the bloodstream, literally within minutes of this activity, and that essentially what's going on is that the psychological stress creates an excessive demand on the mitochondria. And part of how they respond to that stress is by leaking out some of the DNA that's contained inside of the mitochondria.

And when it gets into the bloodstream, where it's not supposed to be floating around – you're not supposed to have mitochondrial DNA, which is supposed to be inside your cells; it's not supposed to be floating around in your bloodstream – once it's there it now serves as sort of a danger signaling molecule that other cells can now pick up on and shift more into a defense mode.

So there's some researchers now in this field called mitochondrial psycho biology that are conceptualizing mitochondria as even upstream of things like the HPA axis or the limbic system, sort of these critical stress response systems of the body. So there's more layers to the story that we could talk about here, but I think that kind of gives an overarching view of my framework for how I like to understand fatigue.

One other point that I'll mention is, certainly insulin resistance and the inflammation that tends to go along with it, and just the blood sugar regulation issues and the hormonal issues that go along with it, can also be a trigger for shutting down the mitochondria. It can be sort of a danger signaling thing that the mitochondria are picking up on and then deciding to direct resources out of energy mode towards defense mode. And so that's why fatigue tends to be a very common thing in people
with diabetes or insulin resistance as well.

Dr. Brian Mowll: I want to come back and talk about how do you figure all this out and what to do about it. But before we do that, talk a little bit about circadian rhythms.

Ari Whitten: Yeah, so we are all tied to the sun. And I think as modern humans we've kind of forgotten that. We're living indoor lives. And right now we're sort of in a room with these fluorescent lights right around us. And as modern humans we've really gotten used to this as the norm. And we've, I think, forgotten how connected we are to the rise and fall of the sun. But the truth is that we are because it's been programmed into us by millions of years of evolution.

And that is the fundamental reason why we go to sleep at night and why we wake up in the morning. It's not through our conscious decision to do that. But just think about that. Every night our biology, our brain, switches into an entirely different state of conscious for six or seven or eight or nine hours. And then again, through no volition of our own, we sort of wake up.

And then we switch again into a different state of consciousness and then go about our day and then again do the same thing the next night. That is orchestrated by lots of different neurotransmitters and hormones that are all following a particular sequence that is actually according to a 24 hour period which is sort of dictated by the rise and fall of the sun. And it's mainly controlled by this circadian clock that we have in our brain, in a part of the brain called the suprachiasmatic nucleus. And the main signal that controls that is light.

So that's what I mean when I say that we're tied to the rise and fall of the sun. We're tied to light and darkness that feeds back through our eyes, through nerves, into this circadian clock that then impacts on all kinds of neurotransmitters and hormones that impact or mood, our wakefulness, our energy, or our sleepiness, as well as things like hunger and appetite and blood sugar regulation and metabolic regulation, so whether you're inclined to gain fat or lose fat, and lots and lots of other processes. So we can dig into specifics from there.

Dr. Brian Mowll: The circadian rhythms can obviously have a huge influence on our physiology and our health. How do we balance those? How do we try to come back to normal, if you will?

Ari Whitten: Yeah, so as I said, one of the big problems is that we have become disconnected from the sun. So it is mainly light and specifically light in the blue wave lengths, and to some extent the green wave lengths. So if people don't know what I mean by that, picture when you learn the colors of the rainbow.
And if you filter sunlight through a prism, sort of the colors separate. Those are the different wavelengths of visible light that are visible to the human eye. And it's red, orange, yellow, green, blue indigo, violet. And then it gets into UV. So those are the colors of the spectrum. It's specifically the blue and green wavelengths that most strongly affect our circadian clock. And those wavelengths give our brain the signal it's daytime. It's the time to be awake, alert, active, and energetic, okay. And part of what happens then is a series of neurotransmitters correspond to that.

So, for example, orexin is a main one. And that's a wakefulness neurotransmitter. But also things like serotonin and dopamine as well as Gaba are all intimately tied to the circadian rhythm. And then there's also a hormonal aspect of this, which is things like cortisol is released in the morning to create a surge of blood sugar.

And so there's a relationship of the cortisol release, which also follows this circadian pattern to how our body regulates blood sugar levels and a number of other hormones that tie into it, leptin and ghrelin and thyroid hormones and lots of other hormones that impact on energy and metabolism and blood sugar regulation.

And then at night, when the sun goes down, we're supposed to not have really any blue or green light entering our eyes, okay. And the only light that would be available in that setting is firelight, which basically doesn't have any blue or green light. It's pretty much yellow, orange, and red light, which doesn't impact our circadian rhythm.

So at that point, in darkness or in light of those wavelengths, that's now sending a signal it's dark. It's the time for sleep and rest and rejuvenation. That's how our circadian rhythm is designed to work for millions of years of evolution.

The problem is, we now live in a modern world, where we have indoor lighting. We have TVs. We have computers. We have iPhones. We have car lighting and street lighting and all of these sources of manmade artificial light, which unfortunately emit lots of blue and green light that are then sending our brain the signal it's the time to be awake, alert, active, and energetic.

And that is fundamentally the main cause of circadian rhythm disruption in the modern world. We're not getting nearly enough of the sunlight exposure and the bright sunlight exposure that we should be getting in the morning and throughout the day.

And then in the nighttime, after the sun goes down, we're getting way too much blue and green light from all these artificial light sources that we shouldn't be getting. And so the end result is, if you picture your circadian rhythm as sort of... I like to think of it as sort of like a wave...
form, with a peak and a trough. And what you want, if you have a strong circadian rhythm, is you want a big peak. You want strong signals telling your brain it’s the time to be awake, alert, active, and energetic.

And then you want a big trough. You want the right signals into that clock in your brain so that it can regulate all those neurotransmitters and hormones telling it it’s the time for rest and rejuvenation and sleep. And if you start to throw off those signals, you blunt the peak, and you blunt the trough. So you’re not as awake and energetic as you should be. And you don’t sleep as well as you should be.

Now what that translates into in practical terms is what we have in the modern world. We have an epidemic of fatigue, and we have an epidemic of sleep problems and insomnia. And a big part of both of those things, there’s sort of two sides of the same coin, energy levels and the quality of sleep. And they’re linked by the circadian rhythm. So that is certainly a big piece of the energy puzzle. And it’s also a big piece of the blood sugar regulation and overall metabolic health puzzle as well.

**Dr. Brian Mowll:** Yeah, absolutely, because we see that sleep problems are a big cause of blood sugar issues and metabolic issues and weight gain and so forth, and then the energy piece you mentioned as well.

So you spent some time talking about mitochondrial health and did a really good job of explaining all the different factors that can influence mitochondria. How does one go about figuring out what’s going on and then trying to come up with a solution, a plan to actually fix it?

**Ari Whitten:** I think that we are often too quick to jump to having people spend thousands of dollars on all kinds of fancy tests, many of which are unfortunately not as valid as we’d like to believe they are, and then sort of trying to come up with these individualized programs based on what we detect based on those tests.

I’m personally of the opinion that if you have the right template of sort of optimal nutrition and lifestyle strategies, that can pretty much take, I would say, 90 plus percent of people 90 or 100 percent of the way to optimal health, optimal metabolic health, optimal energy levels, optimal blood sugar levels and body composition, just by doing those strategies, even without any sort of advanced testing or customization of the protocol to that individual.

And then certainly there’s a place for that. If somebody’s doing lots and lots of these strategies in terms of the nutrition and lifestyle strategies, and they’re still not getting all the way there in terms of their results, then you might want to go look for something. Or if there’s some symptoms that are calling out to you as being a potential sign of
something serious, by all means do the tests to figure out, hey, is there something more serious going on.

But I’m really of the opinion that the vast majority of people can get pretty much all the way to amazing energy levels and amazing body composition and blood sugar regulation by just having the right system of nutrition and lifestyle habits.

**Dr. Brian Mowll:** I think that's really good advice. I've been on both sides of that. I've run a lot of tests, and it seems like there was clinically useful information. But I've also taken care of a lot of patients with just really good history and some questionnaires and really having a great conversation with them, a consultation to understand what's going on with them. And I think the results can be good either way.

And I think you probably don’t need to do the tests in a lot of those cases. So I think that's really good advice. And I think it comes down to really being able to look at that person, do a good assessment, and either do that on yourself with the right information or a program like yours, The Energy Blueprint program, and being able to take that and kind of figure out what you need to do, and then, like you said, going through the right lifestyle changes. And I think 85, 90 percent of people are going to get better that way, makes a lot of sense.

**Ari Whitten:** For sure. But there’s also a subset of the population, and this is the subset that is most likely to end up seeing someone like you, that they've tried a lot of things, and there are still some symptoms or some lack of results that have been going on no matter what they're doing, that maybe they need someone to find out what's wrong with them and dig in there with lots of different tests.

I think that someone's lifestyle habits can tell you, in most cases, just as much as biomarkers can. So I'll give you an example. There was a recent study where they looked at risk of heart disease. And they didn't measure biomarkers. They measured the simple act of how many pushups people could do.

So can you do one pushup as a starting point? Can you do more than 10, 20, 30, 40? They found that the people who were able to do more than 40 pushups had something like a 95 percent lower risk of having a heart attack or a stroke or cardiovascular event in this window of time – I think it was 15 years or something – as compared with the people who could do less than 10.

So I think that this kind of thing is a really underrated way of looking at, sort of evaluating, a person's health. I personally believe that that simple thing, just looking at how many pushups someone can do, this one type of activity is just as powerful or maybe even more powerful as any
biomarker that you could possibly measure. I mean it might even able more strongly correlated with low risk of heart attacks or cardiovascular events than something like their LDL measurements or their total cholesterol or any combination of cholesterol numbers or their CRP or any other biomarker that you could possibly measure.

So I'm very into that. Let's measure the lifestyle habits. What do those look like? And that, I think, can give you almost just as much insight into what's going on in a person's body and where they're at as the biomarkers can. Certainly if you have both, you get a great picture.

But I think the lifestyle habits can tell you a lot and can be used as a diagnostic, just the same way you take a blood test, and you look at a person's result, and you compare it to a template of what the optimal ranges are, I think you can do the same thing with nutrition and lifestyle habits. What are your habits, and what does the optimal template of habits look like? And then where are things off, and where can we correct them to be in the correct range? And to some extent I would even argue that it leads to more direct targeted interventions that are actually supported by lots of evidence.

So, for example, if you are just looking at biomarkers, to take the conventional medical model, let's say they're looking at some measurements of cholesterol and LDL. And they see that they're off. So let's alter the biomarker by using something like a statin drug, okay.

So the thinking, the paradigm, becomes focused on the biomarker. In this model that I'm presenting, focusing on the habits, the approach, would be like this person is clearly not eating very much greens or berries. Let's introduce greens and berries. So now you can compare what does the evidence look like for the statin drug in terms of how that affects various disease risks and longevity, and what are the associations in terms of brain health and all the different relevant mortality end points and disease end points.

And then you can do the same with the intervention of increasing greens and berries. And personally I'm of the opinion that massively increasing a person's greens and berries intake is going to have way, way more positive effects than the statin drug approach on a much broader variety of different disease end points. So that's kind of my model. That's how I like to look at things.

Dr. Brian Mowll: I like that, makes total sense. And anybody can apply that.

Ari Whitten: Yeah.

Dr. Brian Mowll: Yeah, so excellent. Ari Whitten, I appreciate you being
here and sharing some really powerful information. If people want to find out more about the Energy Blueprint program that you have, because I think that's a really good next step for people, what's the best place for them to go?

**Ari Whitten:** Yeah, so my website is theenergyblueprint.com. And if they want to sign up for a free master class training, I have a four video training course that I offer. And they can get it at theenergyblueprint.com/virtual-training.

**Dr. Brian Mowll:** Virtual-training? Okay, excellent. Thanks for being here. And thanks for spending some time with us today

**Ari Whitten:** My pleasure. Thanks so much for having me.
Dr. Brian Mowll: So I’m here with Dr. Anna Cabeca, the author of *The Hormone Fix*. And we are going to talk all about this book. But specifically, how hormones relate to blood sugar and Diabetes. Maybe can you just share a little bit about your new book, and maybe what you describe in there and how you look at these different hormones?

Dr. Anna Cabeca: Yeah. Absolutely, Brian. One thing in my nearly 30 years of clinical experience is that I realized that it takes more than hormones to fix your hormones, right? And that most of us are really confused about what’s happening to our hormones and what’s happening to our bodies.

And so through my personal trials and tribulations as well as working with tens of thousands of women, I incorporated the easy lifestyle strategies and disciplines that everyone can do to control their hormones. And I differentiate our major hormones like the major drivers being insulin and cortisol from the ones I really love talking about. But are really minor. The progesterone, estrogen, testosterone, and even DHEA.

Dr. Brian Mowll: So why are the insulin and cortisol, why are those major and the other ones are minor?

Dr. Anna Cabeca: Yeah. So insulin drives can influence progesterone,
testosterone. And the same with cortisol. Cortisol can affect our DHEA projection as well; we know when we’re stressed. The estrogen and testosterone are going to be decreased in production as well.

So I always consider it like estrogen and progesterone are the students in the professors’ classroom at your university Biology 101 class, right? So our hormones, we have 150 circulating hormones or so in our body. But the major ones being like the professors at the head of the classroom would be insulin and cortisol. With the head of the entire department being oxytocin.

Oxytocin being the crowning hormone. Our hormone of ultimate love and connection. And it has such an influence on our physiology, that’s why I like to call it the crowning hormones.

If you get that visual, like here’s your professors telling the students what to do. You’re a good student you’re going to behave and do it right. But if you’re not paying attention you’re not listening. You’re distracted. Those students are going to be in disarray. Well what happens with our sex steroids too.

**Dr. Brian Mowll:** So I would think that the people watching this may be surprised by some of that information. I think that when we think of especially women’s hormones. Estrogen comes to mind first and progesterone. Maybe you don’t even think about insulin. Cortisol a little bit. But oxytocin as the big one. I think that’s a little bit surprising.

Why do you think oxytocin maybe doesn’t get the attention that it deserves, and why do you look at that as this crowning hormone?

**Dr. Anna Cabeca:** Yeah. A couple of reasons. And one thing that was really was important to me as I wanted to fix my own hormones. I was early menopause at 38 and then was able to reverse that early menopause to have a healthy baby at 41. And now at nearly 53 with at 10-year-old we’ve got to keep things healthy, right?

But in my search to make it simple for me, it was to get to the main players, right? And so that’s why we have to fix cortisol, and we have to fix insulin. Because again when we’re stressed, when our body’s inflamed when we’re insulin resistant, it’s affecting estrogen and testosterone.

So we’ll get a lot better from our natural hormone production if these guys aren’t on rampage, essential. And are chill and calmed down. Then estrogen, progesterone, and testosterone can have its role in our body and do what it’s supposed to do to be our nurturing hormones. Our rebuilding hormones. But that can only occur in this delicate balance.
Now, oxytocin is something that I know as an obstetrician. I knew it well as an obstetrician. But in my book I also talk about the effect of chronic stress on oxytocin. When cortisol goes up, oxytocin goes down, and when cortisol is up too long, too high; to keep it from frying out nervous system. Our paraventricular nucleus in the brain will suppress it back down.

So when then we get these low cortisol, low oxytocin. And what we experience when our physiology is there, we experience burnout. We experience disconnection. I always say when you go into a restaurant and see you someone who was a long-time friend, and you pretend you’re not even there, you ignore them, right? You don’t engage in conversation. You prefer to stay home and alone versus being social. That’s loss of this powerful hormone oxytocin.

And as we get older, as we end the second stage of our lives, the most important things to us are these relationships that we have. Are the love in our life. Are the things that we’re so glad we have done today or yesterday. That have made us smile. The warmth and love in the relationships within our own families and our own household. That’s oxytocin. We get that from oxytocin.

So to empower oxytocin, we’ve really got to control cortisol. And I experienced in myself post-trauma, total burnout, disconnection, ended in divorce. Ended in a career that I love, having to close my doors. It was burnout, essentially burnout. And when I realized that I was incredibly able to turn my life around. And my relationships.

So I have four daughters. I have the best relationships with my four daughters, age 10 to 30, that I ever had in my entire life. That’s oxytocin. And that’s what I want to shout out, out from the mountain tops. There’s a way to improve our physiology that improves the quality of our life.

**Dr. Brian Mowll:** Wow. Very cool. That’s an inspiring message.

**Dr. Anna Cabeca:** Thank you.

**Dr. Brian Mowll:** So how do we control cortisol levels then? Because this is important for what you just talked about. Also, for blood sugar because we know that stress and high cortisol levels raise blood sugar. And then there’s a connection there with insulin as well.

**Dr. Anna Cabeca:** So, in my book, I teach people to follow the Keto Green Way. And so by this we get the ketosis component from intermittent fasting and more healthy fats. Like a ketogenic component to our diet. That’s nutritional sound, and that creates insulin sensitivity, right? So with that ketosis getting our body into this fat-burning stage producing ketones we’re going to become more insulin sensitive.
So I go over in book a ten-day Keto Green quick start and 21 days of menus to give you the guidance. But it's less than half about what we eat. The other part is how we live. Cortisol, we know that the more alkaline vegetables and alkaline foods, that can affect our cortisol. That can help improve and decrease cortisol.

Also, we know that meditation, getting out in nature, getting a good night's sleep all can decrease cortisol. And also, I have clients measure their urinary ph. So those behaviors also increase our urinary ph. So by looking and actually and testing urinary ph. It's a marker just like the weight on the scale, right? It tells you a little bit about how your body interacting with the environment.

And so that gives you a guideline. Okay, well, I'm eating great, and I'm stressed, and my urinary pH is acidic, but I'm eating the same stuff and fun with my friends, and I'm alkaline, right? That's important because we need to control cortisol. We need to control it, so we get good night's sleep, and that we can restore oxytocin. And put oxytocin back up where it belongs as the center focus gem of our lives.

**Dr. Brian Mowll:** Actually, you can change your pH through activities, not just through foods.

**Dr. Anna Cabeca:** Yeah. Absolutely. It's so interesting. Because we use urine to look at so many things. We look at hormones in our urine. We look at organic acids. Like how's our blood chemistry? What’s our nutritional status? We look at that in our urine.

The ph tells us a lot because we're looking at what's happening with the minerals in our body. So our urinary ph is a guideline. It's in an inexpensive, easy marker, just costs pennies a day to check. And what my clients have found out online as well as myself. Is that we're able to figure out, okay, what's affecting our body, how's it affecting us?

Many clients figure out that they have a food sensitivity. They stay away from dairy. They're eating alkaline vegetables. They're eating Keto Green. And they have been under very good control with their nutrition. Then they'll eat something like cheese, and they're sensitive. Their urinary pH drops that next morning. So it's really interesting to see.

And we know naturally our urinary pH will be more acidic after we exercise. But that's okay. We want that balance. But we want to optimize the alkalinity of our urine. What research has shown, as I've dug into more and more is that the higher urinary pH, above seven, so slightly alkaline. We see a decrease in Diabetes, hypertension, heart disease and the list goes on.

What I've seen in my clients online as they Keto Green, we see energized
enlightenment. We see clarity. We see that peace that surpasses all understanding. And being able to do that has turned my life around. I've been able to write a book. Like four hundred and some pages, right? And I've been able to create online programs. I've been able to get the message out so I can pour this out into other people so they can have the quality of life.

I wouldn't have been able to do this five years ago when I was struggling. When my body was in a hormonal turmoil, and I was exhausted, and had brain fog. All of that clears up in this approach because we're addressing the major hormones.

Dr. Brian Mowll: So Keto Green is a ketogenic diet and alkalizing greens.

Dr. Anna Cabeca: And the lifestyle factors. So that's the food component. Twenty-five to thirty-five percent is what I usually say. And then the lifestyle component. Getting out in nature, exposing your eyes to sunrise, sunset, and the many other factors.

So many people, I've even had vegetarians have urinary acidiy, and they're like, “Why?” And I'm like, “Well, let's go through this checklist.” Are you hydrating? Are you getting outside in nature? And I have a whole list of other things that can affect our body's ph. What else is going on? Are you juicing and having too much sugar. So you're becoming insulin resistant with high circulating blood glucose. That's going to affect you as well.

Dr. Brian Mowll: So we talked about managing cortisol levels, and that's a lot of what this is all about. Are there other things that you can do to raise your oxytocin levels?

Dr. Anna Cabeca: Yes. Absolutely. So definitely that's one of them. But we know, as an obstetrician, I say we're very familiar with oxytocin because when a woman's in labor; and we want to speed on labor we give them IV pitocin. Pitocin is oxytocin. So that was my first experience as an obstetrician with exogenous oxytocin.

Rarely have I ever need to prescribe oxytocin. Rarely because we have so many mechanisms to increase it ourselves. So by enjoying things that we love. By laughter. Certainly by sexual health and sexual intimacy. Hugging, kissing. Playing. Having a pet. All of those things increase oxytocin. And getting out in nature too. Just being able to be at peace. Meditation. Prayer can increase oxytocin as well.

Dr. Brian Mowll: Wow.

Dr. Anna Cabeca: And they're all free. And not only that oxytocin
we know is a natural anti-suppressant. It's also an analgesic, so don't remember the pain of labor. We don't remember the discomfort if we've got oxytocin and joy in our lives.

And it also has been shown in a study out of University of California Berkley that it has antiaging effects on the muscle. So muscle cell regeneration. Oxytocin helps that even in aged muscle. So at any age that's a component that's powerful healing hormone plays a role.

The problem with oxytocin is that it's hard to test. We have to do a quick fresh frozen plasma, ship it, FedEx out. And only a few, two, especially, labs in the United States, there may be more now. But we'll test that for you. But it fluctuates so much. So I have a questionnaire on my website. My oxytocin quiz. And I talk about that in my book as well.

Dr. Brian Mowll: Now these more minor hormones that you discussed estrogen, progesterone, and I also want to ask you about testosterone because a lot of people listening to do this may have suffered with PCOS. Which is related to insulin and testosterone in women. So where do the more minor hormones fit in, and how do you influence those in a positive way?

Dr. Anna Cabeca: Yeah. So definitely, like especially with PCOS getting insulin sensitive is key. Intermittent fasting, no snacking, all of those things. That will help the testosterone levels that is really important because then we can increase – the more insulin sensitive, the higher our sex hormone-binding globulin. More bound testosterone. So that's one aspect.

And as far as progesterone, oftentimes after age 35, certainly after age 45, progesterone levels have declined. And that's one of the first hormones that I will supplement with. Transdermal creams, small amount 10/20 milligrams even. Initially in that perimenopause time frame. Is really beneficial to help get a good night's sleep. Plus, it has protective effects for the brain, the bone, the breast. So bioidentical progesterone. That's a really big one. And that can help.

And DHEA I used DHEA a lot as a marker when I’m looking at blood work to see, okay, resilience. Healthy DHEA levels, more likely resilience, less illness, etc. But also we use it a lot in sexual health. So transdermally, like with [myjova] cream has some DHEA, plant stem cells. And that's antiaging at its best for a very overlooked part, sometimes of our healthcare prescription.

Dr. Brian Mowll: Wow, important information, especially for women’s health here. This is something that I think all women should look into. So, Dr. Anna Cabeca, the book is The Hormone Fix. And where do people find out more information about you, and how can they get the book?
Dr. Anna Cabeca: Thank you, dranna.com\book.

Dr. Brian Mowll: Thank you so much for being here and spending some time with us.

Dr. Anna Cabeca: Thank you so much for having me.
Dr. Brian Mowll: So I'm here with Dr. Ann Shippy, and Dr. Shippy we're going to talk today a little bit about the link between environmental toxins, and particularly mold toxicity. And really overall health, chronic health conditions. But Diabetes and blood sugar problems specifically. I don't think a lot of people make this connection.

Dr. Ann Shippy: They do not. But the literature really does show that there's quite a link between environmental toxins and diabetes. In fact in some studies it's been shown that having high levels of environmental toxins is even more of a risk for Diabetes than being obese.

But it's so fascinating what I see in my patients. That have had a build-up of environmental toxins. They tend to gain weight too. Because I think the body's trying to keep the brain, and the heart, and thyroid, and all of the vital organs as safe as possible. So it's a lot safer to make a new fat cell, or make a fat cell larger and put the toxin into that.

So it really is a very relevant topic to think about how to deal with environmental toxins, especially if the patient's already doing all of the right things with how much they're eating, and what they're eating, and getting exercise, and getting sleep, and all of the other foundational things. If you're still not getting really good control of your blood sugar, it could really, really help to find a physician that can help do the testing for environmental toxins.
A lot of times, the traditional physicians don’t – which I am, I’m an internist, but then I have the functional medicine training on top of that. A lot of times, they don’t know how to actually test accurately for heavy metals, and for pesticides, and for the things that outgas, mattresses and clothes, and carpets, and paints. And the glyphosate issue with our food. You have to use labs that a lot of times don’t take insurance.

**Dr. Brian Mowll:** Yeah. I think you’re right. I don’t think that patients or even many doctors know that these tests are even available. And then also there’s an idea that maybe they’re not accurate, valid tests because they’re not part of the standard lab profile too, typically. Can you talk a little bit about how these things are tested, and maybe some of the more common types of toxins that one might want to have tested?

**Dr. Ann Shippy:** So it is controversial. But for me, I don’t need a perfect lab test. I need something that guides me in the right direction in my detective work to find out what I can really do to help the patient.

So I’m willing to try new lab tests and see what information it can provide for me and how relevant it seems to the path of getting them well. So I love to test for – there’s some things we can check as a blood level. That’s not very many things. That would be some of the pesticides, and some of the altered organic compounds. And then there’s some tests that we can do from the urine to see what is actually going out.

But then to look for heavy metals like mercury, aluminum, lead, the best way to test for it is to take a chelating agent, a very gentle one, and see what comes out. If you compare that to what’s coming out without an agent, to what comes out with an agent, you get a pretty good idea of what’s stored in the body. That wouldn't be detected by just doing a blood test or a urine test.

**Dr. Brian Mowll:** We hear about things like Bisphenol A and other types of these persistent organic pollutants. Things in cosmetics and plastics, and the air we breathe. What do you think are the most common, and maybe those are some of them, but what do you think are some of the most common toxins that are really causing health problems? That people are seeing on a regular basis that could be really contributing to these types of chronic health issues.

**Dr. Ann Shippy:** Yeah, when you ask me that question, I want to cry. Because of the trajectory of what I'm seeing in my patients from 14 years ago to now. I'm seeing a dramatic increase in levels of toxins. And it could be that I am seeing more patients that are very ill. But I don’t think so. I think the average person is really accumulating these toxins.

So I just got to interview one of the leading researchers doing a study on glyphosate. And they’re doing crowd-funding to finally get truthful, no
influence from government, no influence from industry to get the truth on glyphosate. To see if there is a safe level that doesn't cause cancer.

So in that interview, he said that if you sprayed glyphosate it would just in the spraying process would cover two-thirds of the globe now. Of course we have some heavily – some areas where there’s a lot of farming. That there’s a lot heavier accumulation there, and that’s where we are seeing the biggest risk factors with the endocrine disruption. And with the cancer cases.

But the studies that are going on now are going to give us even better information on it's even what we're getting in our water, it's even in the rain now. Is that even a safe level for us?

That’s why I said I want to cry when I really have to think about it. And I’m seeing it. Like I find that even my patients that think they're eating mostly organic. Not zero, not in the green range, what they think is the green range for glyphosate. It’s higher than green almost every time.

And I can also do a test that I get to send off to Germany. That looks for something called epigenetics. It’s when the toxins sit on the genes. And I've seen that in a couple of patients now where there were particular genes, that how well they're able to work is being impacted or blocked by having glyphosate sit on the genes.

So I think that’s one of the biggest health crises that we are going to be facing because we haven't had the regulations in place to prevent an enormous distribution of a very strong pesticide on our planet.

Dr. Brian Mowll: So, in the face of all of this, what do you think are some of the things that we can do personally? I mean obviously we want to make a global impact, but personally for our health. What can we do to protect ourselves or to help rid our bodies as much as possible?

Dr. Ann Shippy: Well, one thing I think the crowd-funding is really a great idea. Like we need to get the right research in place so that public policy gets shifted. So that you have to prove these things are safe before you dump so many tons of the chemical into the environment. And then we can do it with our dollars. If we quit buying the pesticide-laden GMO products. There are some GMOs that aren't pesticide-laden. I know there's a difference. But much of it is. Then the farmers will adapt, and they'll grow food that's organic and that there's not pesticides on it.

There's a new company called Zego. I don't know if they're new or not. They've been around for three years where they have perfect transparency on their product. There's a QRS code on each bag or box, and you can see what it's tested for. So you can see, does it have glyphosate? Does it have gluten? Does it have other pesticides?
And when I was talking with her a few weeks ago, she said that they hadn’t had to use organic raspberries to still get a low chemical residue in their food products. But then this year they did. They started seeing a very high level of one of pesticides, which is a very strong neurotoxin. And they were like, “What’s going on?”

Well, it turned out that the raspberry growers were having a big problem with mice this year. And so they had to soak the raspberries a pesticide to not have their crops destroyed. I mean, it really is a big issue. We need to be able to grow food. To feed the masses that’s going to cause all of these problems with pesticides, fumigates.

**Dr. Brian Mowll:** The company that you just mentioned, what do they do? Do they publish information?

**Dr. Ann Shippy:** So it’s Zego. And they test all of their incoming materials to see what the chemical, metal, pesticide levels are. And it’s a huge issue. Even cinnamon and turmeric and that kind of thing can be very heavily full of containments. If the food company aren’t even testing to see what their incoming materials are, and then making sure nothing’s happened in the manufacturing or preparation process. It can actually, even if it says organic, it can be full of things.

So they have full transparency. Every batch gets tested. And that QRS code on it, you can scan it with your phone. And it will tell you what all it was tested for and what the levels are.

**Dr. Brian Mowll:** It’s a model for others to follow.

**Dr. Ann Shippy:** I’m so excited about what they are doing.

**Dr. Brian Mowll:** So what can we do for our own body and own health with all of these toxins all around us?

**Dr. Ann Shippy:** So we can choose wisely. With what we put on our skin. Have things like air filters to filter our air, at least at night when we’re sleeping. Our cleaning products, as we’re buying new ones, we can pick the ones that have the lowest toxicity to them. I think a lot of it is an awareness. And just even knowing that it can make a difference. Because the little bits of accumulation each day really add up.

And then, from my perspective, taking certain supplements can really help. So like some glutathione is one that I find is very helpful. A lot of binders like clay and charcoal, especially if they’re not contaminating can be very helpful.

And then supporting our mitochondria. Our organelles inside our cells to make energy so that the whole detox pathway is fueled. If you have
access to a sauna, that's really great. Getting in a hyperbaric machine is even better if you have one that you can use. It's not as common, but it can be super helpful for detoxifying.

And then foundational is the diet. You need the nutrients that run your biochemistry and physiology that help you to detoxify. So my favorite things are the cruciferous vegetables. The broccoli, cauliflower, cabbage, kale, and then the onions and garlic. The organic raspberries and the blueberries. Those brightly colored foods that have all of the good bio-nutrients in it.

Minimize inflammation. When you minimize inflammation, everything works better, including our detox pathways.

**Dr. Brian Mowll:** Excellent.

**Dr. Ann Shippy:** So there's so much we can do. I don't want to be scaring people. I just want to help you to be aware. You mentioned the BPA. That's another big thing. I see a lot of elevated BPA levels and impacting testosterone levels, blood sugar levels, fertility. So not having food that’s been plasticized.

I had a really interesting situation in the last couple of months where I was wanting to put in some new blackout curtains in my bedroom. So I could have cave-like darkness to sleep. And I thought I was ordering a fabric liner, but they had one that was not quite fabric. And I was like, “Oh, what's in there?” And it was PVC, which can then outgas and is an endocrine disrupter. Oh, we need to start over. Sorry, I can’t have that. I don’t want be having those fumes coming into my house. So even I'm kind of learning as we go. But it's just asking the questions, and then making the best choices we can at the time.

**Dr. Brian Mowll:** Yeah. These are important things that people just don't think about often. And we really need to think about these things, and it can make a huge difference.

**Dr. Ann Shippy:** Sometimes it's in our habits. It's things we've either have done all of our lives or our parents did. I even had a patient that when she got sick, she sprayed Lysol on her pillow. Even though we'd been having conversations about, now let’s make sure – she had some autoimmune things that we were working on. And so we were having these conversations about all of the other things that it never dawned on me that she would have learned from her mom to spray Lysol on her pillow, and she got sick.

**Dr. Brian Mowll:** She didn’t even know what she was doing, and didn’t even think about it.
Dr. Ann Shippy: Exactly.

Dr. Brian Mowll: It’s amazing.

Dr. Ann Shippy: Because it was so ingrained. So that’s just like a pause on anything you buy, anything you bring into your environment. Just do the best that you can.

Dr. Brian Mowll: All right. Dr. Ann Shippy, thank you so much. If people want to learn more from you, what’s the best way to do that?

Dr. Ann Shippy: My website is annshippymd.com. And we’re on social media with Facebook and Instagram. And we really try to put out good tips every day, every week so that you’ve got healthy food to cook. And start to learn about some of these tips that you can it a day at a time rather than being overwhelmed.

Dr. Brian Mowll: Thank you so much for being here with me.

Dr. Ann Shippy: Thanks for having me.
Dr. Brian Mowll: Okay. So I’m here with Andrea Nakayama, and we’re talking about functional nutrition. And you have a practitioner training called the Functional Nutrition Alliance, which we’ll probably talk a little bit more about in a few minutes.

But we’re just talking about the different factors look at when you work with someone on their health and what you teach to your practitioners. Can you talk a little bit about that, and how it relates to Diabetes and blood sugar?

Andrea Nakayama: Yeah. Absolutely. So the training curriculum is called The Functional Nutrition Lab. And what I liked to think of as our protocol is what I call the three tiers to nutrition mastery. I like to think of it as the three tiers to epigenetic master. But I know that’s a harder term to think into.

And those three tiers include; tier one, the non-negotiables; tier two, deficiency to sufficiency; and tier three, dismantling the dysfunction. And in a lot of medicine, including functional medicine, we often want to skip to tier three and ignore the tier one and tier two work. And that’s where we really establish what’s true for the individual.

Everybody with Diabetes got there for different reasons. There might be some similar factors, but we start to really uncover what are the
deficiencies in your life, in your nutrient intake, what are the non-negotiables in your life, and how you eat and live your life. And start to really develop our approach to care based on that individualized understanding.

Dr. Brian Mowll: So you mentioned epigenetics, can you talk a little bit about what that is, maybe for people who haven’t heard that term or want to know more about it?

Andrea Nakayama: Yeah. Absolutely. So oftentimes, especially today, we’re very attached to this idea of the genes. And yet we know that the genes load gun and the environment pulls the trigger. The epigenetics are the environment. They’re basically everything that surrounds the gene and turns those factors on or off.

So just because we have a genetic determinant, doesn’t mean that it determines our outcome. Just because we have a genetic factor, I should say. Doesn’t mean it determines our outcome. The epigenetics are what turn on or off the expression of the genes that we have. And that’s where we really have to spend more time making change.

It’s also where we as patients, are more empowered to make change. Because it’s the stuff we do between our doctors’ visits that matters most.

Dr. Brian Mowll: Wow. That’s powerful. So I think most people realize there’s some genetic component to Diabetes. And Type I Diabetes different than Type II. But both of them have some genetic component. With Type II, in particular, there’s a lot that can be done through lifestyle factors to influence, like you said, how those genes express themselves.

Andrea Nakayama: Absolutely.

Dr. Brian Mowll: I think that’s really powerful because often times people will feel; my mom and dad had Diabetes, one of them died, they lost limbs, and so forth. And now I’ve got it. So it becomes a feeling of dread, like I guess just the path.

Andrea Nakayama: Destiny.

Dr. Brian Mowll: Destiny, right.

Andrea Nakayama: And it’s not destiny, right? And it’s not destiny. I’m working on a new paradigm that I’m thinking of as three roots, many branches. And Diabetes, whether it’s Type I or Type II, is a branch. It’s not a root. And this is where we can get very confused in thinking we have to address the root for everything to express helpfully.
But the roots are different than the diagnosis. The diagnosis is often a tipping point of other factors. And if we can understand those roots. And one of them is genetic predisposition. So one root means you’re primed if you give your body the factors to express that condition. But there’s two other roots, and we have the ability to influence those roots. It’s in our power.

**Dr. Brian Mowll:** And what are those?

**Andrea Nakayama:** I think of the three roots as genetic predisposition, hyperpermeability, or leaky gut, so making sure that our digestive system is functional. And some element of inflammation. It could be an infection. It could be an environmental toxin. But it’s something that’s contributing to inflammation. Our insulin levels and our blood sugar levels are contributing to inflammation. So it’s understanding clinically what are the factors for one individual in those three areas that we can start to address. That leads to more healthy branches.

**Dr. Brian Mowll:** Yeah. That’s powerful. And empowering for the patient because now they know they have some direction in what they can do to actually prevent Diabetes or change their outcomes with lifestyle factors.

So let’s dig a little bit more into these levels. You talked about base and moving up. Can you maybe describe in a little bit more detail about each of those?

**Andrea Nakayama:** Yeah. So the three tiers?

**Dr. Brian Mowll:** Yeah.

**Andrea Nakayama:** Yeah, so three tiers. They’re not necessarily sequential. We have to think that we’re not just doing – if somebody’s in an acute situation where we have to address a dysfunction. Let’s say they have parasites. We have to address that dysfunction. So it’s not like we’re always bypassing three to do one first. We’re thinking who is this? What are their needs right away?

However, for sustainable health, we need to address those first two tiers. The non-negotiables could be about repairing your digestive system, making sure your diet is anti-inflammatory for you, which is going to be different. There must have been a little sugar in one of the sauces I ate last night, and I wake up with inflamed eyes. That’s an inflammatory for me.

Another person could handle a little bit of sugar in something here and there. So we really have to determine what are the non-negotiables with the diet for the individual and even for right now. Because sometimes a
therapeutic diet might be contained to a period of time in your life. And you might be able to introduce foods. You may need to eliminate foods depending upon what other triggers you encounter.

Non-negotiables are also your bedtime, and your exercise routine, and your hydration, and your ability to deal with stress. Or find resilience. And what that means for you. So for me, a non-negotiable is getting out in the forest and having forest bathing time. Where I can recuperate and regenerate.

Dr. Brian Mowll: So these are the big rocks.

Andrea Nakayama: Non-negotiables, and they're individual.

Dr. Brian Mowll: Yeah. Okay. Excellent.

Andrea Nakayama: Yeah. And tier two deficiencies could become non-negotiables. Again there are three tiers, but they are not necessarily these contained units. So let's say you have an iron deficiency or a Vitamin D deficiency, and you have an inflammatory condition. That's a non-negotiable that you supplement or replete that nutrient.

You have a depletion in hydrochloric acid or in adrenal stress hormones. We need to address those deficiencies in order to thrive and survive. And sometimes even do the deeper work.

At our clinic, at The Functional Nutrition Alliance, we'll often see people who are getting the right medical treatment. But it's too fast for their body. They don't have the resilience and the mechanisms that their body needs. So we need to slow down, replete before that intervention can happen.

And so that tier two work, deficiency can be in love, or in play, or joy, especially for people who are sick and suffering and not getting better. Connection. So all of these things are deficiencies. It's not just thinking about our nutrients or the supplement that we need; it's everything in our whole life.

Dr. Brian Mowll: Makes sense. And then what is that third tier?

Andrea Nakayama: That third tier is where we are saying, “Oh, Andrea, you have Hashimoto’s, you have Diabetes, you have this infection, you have C.diff.” We have to address those dysfunctions. We have to say there's a microbial dysfunction. There's a fungal dysfunction. There's mold toxicity.

However, if you try to do that intervention as clinicians without addressing the other factors, we're going to be in this constant, just
attempt. But the body can't handle the insult of the intervention. And so the person just gets sicker or can't figure how to get through it. And ultimately relapses.

**Dr. Brian Mowll:** So foundational, non-negotiables, and then we have the deficiencies, and then finally like these disease states that need to be maybe addressed directly.

**Andrea Nakayama:** Exactly. And we are addressing them with the tier one and the tier two work. And oftentimes we can bypass the more aggressive intervention when we pay heed to the tier one, tier two work. And with the type of practitioner that I am, a functional medicine nutritionist and the allied functional practitioners that I train. Nurses, RD's, all of the people that are not practicing medicine, there's a tremendous amount of work we can do with a patient population that's growing faster than we can keep up with.

That does fill that gap between addressing the dysfunction spot on, and all of the lifestyle change. That actually needs a clinical vantage point beyond a coaching method, because we need to see what's going on with the individual and do the right lifestyle and diet interventions.

**Dr. Brian Mowll:** Yeah. That's fantastic. I think what helps to figure out those tiers is doing that good initial evaluation functional medicine matrix, putting everything together in a way that it makes total sense. And kind of put the puzzle together. And that's what's so valuable about the functional medicine model and what you're teaching in your program, I think.

Okay, Functional Nutrition Alliance. Andrea Nakayama, thank you so much for being with me here today.

**Andrea Nakayama:** Thank you.

**Dr. Brian Mowll:** If people want to find out more about your program, where do they go for that?

**Andrea Nakayama:** Yeah. Just go right to fxnutrition.com and we'll lead you to the right place for you.

**Dr. Brian Mowll:** fxnutrition.com?

**Andrea Nakayama:** Yeah.

**Dr. Brian Mowll:** Okay. Thank you.

**Andrea Nakayama:** Thank you.
Dr. Brian Mowll: So I'm here with Dr. Alan Christianson, author the *Metabolism Reset Diet*, amongst other great books. It’s the newest book. So I'd love to talk about that, how to reset the metabolism.

A lot of people with type II diabetes, pre-diabetes, metabolic syndrome, they've got some extra pounds, particularly around the midsection. The stats are something like 80 to 85 percent of people with type II are overweight. So they want to reset their metabolism.

Let's start with this. What exactly is metabolism? Maybe we can just sort of describe that in more detail and then we’ll talk about how to reset it.

Dr. Alan Christianson: Awesome question. Really, the simplest thing is how the body converts food to energy. And the issue is that if we did that well we wouldn’t have complications like diabetes and we would keep steady levels of weight. And have good even levels of energy throughout the day. And those things would be automatic.

But when they don’t work out automatically, the question is, how can we improve the metabolism? How can we make that work better?

Dr. Brian Mowll: So let's talk about how to do that. Because I think you know at its core, Type II diabetes really is a metabolic disorder. So how do we reset and fix the metabolism to get our blood sugar better?
Dr. Alan Christianson: It comes down to liver function by and large. So blood sugar is really about blood glucose. There's a bit of fructose around too. But when the liver's working well, it stores that effectively. And so what happens is that the liver becomes more able to store a lot of things in the form of triglycerides or fat inside the liver, and less able to store sugar safely and effectively.

So if someone can lower the amount of triglycerides in their liver, but have a healthy amount of glycogen, then they can reach a state in which they can have a stable steady blood sugar and better weight. And the thing is that for some people, just weight loss can help. But it doesn't always. And there's also a subset of people that's not heavy and still can go on to get type II diabetes. And that's the big link.

You talked about how we got 80/90 percent have these compromises. And yeah, there's many to where their weight is good, but they've lost a lot of lean mass. And they're not heavy but they're too flabby, and they're not able to really regulate blood sugar effectively.

So the trick is really now, not just dropping pounds but dropping inches and getting the body able to store glycogen and have less triglyceride. And a lot of ideas about just cutting food or cutting food categories, it often works. And that's really cool. But for some people, they've got this liver impairment.

And so then it takes a matter of getting a low amount of total fuel. So fats as well. Carbs, fats they're both things that can be good, and also can be excessive. So getting a low enough amount of fuel so that the body has to tap into those reserves. But still getting enough healthy protein so that the liver's reactions are supported, and the liver can fix itself again.

Dr. Brian Mowll: You hit on some really important things there. And I think one of them is the connection between the liver, and the fat in the blood, and how we process glucose. So this is really important. And a lot of people, when they think of diabetes they think of the pancreas. Which obviously an important organ in diabetes.

But I think the liver plays an even more central role because that is a big part of our metabolic machinery. How does someone know if their liver is working well, or if we're getting this backlog of fat and not processing glucose properly?

Dr. Alan Christianson: Great question. Several ways. If someone is quite aware of their blood sugar and they're watching it themselves. Whenever we see morning fasting glucose higher, that's a sign of that. Some people their biggest elevations, are after meals. But some it's often most dramatic in the morning.
And if we think that through that's not a matter of something that just rushed into the body and caused a big surge of blood sugar. What happens is that when we're sleeping, our brain still needs glucose. And since we've not eaten for a while our liver releases that.

And ideally, your liver's got a healthy amount in stores that are not too much, and when it's asked to release glucose it gives about what we need. But if the liver is too crowded with fuel and it's not working well, when your body asks it to release glucose it like just dumps out an extra bucket.

It's like okay, great, I've got too much here, and I'm going to unload this on you now. And then we'll see the levels climb up in the morning. So morning fasting, glucose is one real big sign of that. And we think somewhere around mid-80s is healthiest. We talk about 99 is a threshold of normal, and 114 is a threshold of impaired glucose tolerance, and 126 for diabetes. If you're about mid-80s, low 90s, then that's a sign the liver's dumping off too much.

Dr. Brian Mowll: So a lot of people experience with type II diabetes and even pre-diabetes, a lot of people experience these high morning blood sugars. Like you described. And in fact, that's sometimes their highest blood sugar of the day. And their first thought is, “What did I eat last night?” But what you're saying is that it may have less to do with what they ate last night and more to do with how the liver's functioning?

Dr. Alan Christianson: Maybe last night was a doosey, and that could have been a big factor. But really, what they at last night, yesterday at lunch, yesterday at breakfast, and the last several weeks. The whole conglomerate of that. And if what they ate was on par with what their body could process well and what they needed, they did great.

But if their liver had too little room. And to be really precise, your liver stores fuel as glycogen and as triglyceride. And when it’s healthy it will use glycogen to burn triglyceride. And triglyceride is an awesome energy source. You could power the plant for a long time based upon that. It's very dense in energy. That's why fats are so powerful that way.

But when there's too little glycogen present, you can't burn the triglyceride. So normally, after a meal, we never use all that we consumed on the spot. So we're always going to store some of that for later on. But if you're off on your glycogen, what occurs is that most of the excess is stored as triglyceride. And if you can't burn triglyceride, what that means is that each time after a meal, you're packing it a little tighter inside the liver. You're packing in more and more and more.

And maybe it wasn't even too much. And maybe your body could make use of that. But it's so packed in, and there's so little glycogen it can't
come out. It should be like a savings account where you put some in and take some out where you need to. But it becomes more of a one-way thing to where it goes in but it can't come out effectively.

**Dr. Brian Mowll:** So we're seeing more and more fatty liver, non-alcoholic fatty liver disease. And it seems to trend very closely with Type II diabetes and metabolic syndrome. Is what you're describing, is that essentially what's causing the increased rates of non-alcoholic fatty liver disease?

**Dr. Alan Christianson:** That's exactly what's causing it. When we did like a cellular analysis on a microscope of cells from someone who has fatty liver disease, you can see how the cells are completely filled up, and they're crowded. The cell nucleus, which does a lot of important things, that's jammed in one corner. The glycogen is all compressed, and it's full of these steatohepatitis. It's full of all these fat globules everywhere. So it's exactly what it is.

And you've educated people a lot about how diabetes is not you're perfect. You're perfect, you're perfect now it's a problem. It's a continuum. And fatty liver is the same thing, but it's not really gotten the attention that it deserves. There's a threshold by which when your liver is more than five percent fat by weight, now we define that as a problem. But 4.9, two is better than 4.9. So that's also a continuum.

**Dr. Brian Mowll:** Yeah. And there's been studies that very clearly show that fat accumulation in the liver, and also in the pancreas, and other organs is very closely associated with insulin resistance.

**Dr. Alan Christianson:** Well, here's what's going on. So the body has this fuel, and when things work perfectly, you're either burning it or storing it. When it's not working perfectly you've got to store more of that. And we've got various places to put it. And the most benign place would be muscle tissue.

Then we think about subcutaneous fat like the fat that's around thighs or hips for example. We may not want it, but it doesn't really show impending danger. Then we have the visceral fat, and after that we have the liver itself. That's like the last place. So when the liver itself is completely filled with fat, there's nowhere else for it to go.

So then the body would be at horrible risk if more fuel entered the cells. And insulin kind of coaxes glucose to come into the cell more easily. So your body has to shut down its response to insulin. It makes itself insulin resistant. Otherwise if glucose did come into the cell and there's nothing to do with it, it would cause cell death. It would be like full-on poison.

So insulin resistance is a protective mechanism. And you're exactly right
the consequence of events is such are when the liver’s finally filled up, then the body’s got to leave all of that fuel in the bloodstream. So you have glucose, triglycerides, even ketones. They can elevate in the blood because the body no longer has capacity to take them in the cell safely. The last bucket is full.

**Dr. Brian Mowll:** Yeah. And you made an important point earlier, which is that not all people with Type II diabetes and pre-diabetes are obese or even overweight. And so you talk about the liver as being sort of the last depo for fat storage. But sometimes people move to that quicker than others. In other words they have this personal fat threshold where they may fill up the subcutaneous fat sooner than somebody else might who becomes very obese.

**Dr. Alan Christianson:** And that’s bizarre, it’s counterintuitive. But if that same person had the propensity to get fatter, they would have been safer if they had more places. So it often comes down to how well the body can modulate inflammation, how the body can form new connective tissue, how the body can form new blood vessels and new cells. If you can expand fat tissue in a state of excess that’s a safe strategy.

But when you can’t anymore, then that overflow makes it to where that’s all got to stay in the bloodstream. And now all of that fuel circulating in the bloodstream that’s harmful. That sugar makes your blood cells sticky, and it can’t get to where it needs to go. And vessels are harmed, and everything else is compromised.

**Dr. Brian Mowll:** How do we burn the fat in the liver? So let’s say this process has happened and somebody has diabetes, or fatty liver, or maybe their one their way towards one or both of those. What are some strategies to start to burn the fat in their liver and reverse this process?

**Dr. Alan Christianson:** Well, one more level of nuance is to burn the fat, but maintain or restore their glycogen. So it’s actually really easy to burn the fat, any way you lower total food intake, you can burn liver fat. But the pitfall is if you’re not replenishing glycogen as well then those gains will not be long-lasting. And they’ll often reverse pretty easily.

So that’s why it takes more nuance than just less food or just fasting, just consuming nothing. And we see this too amongst diabetics. If they just do prolonged fasts, they may not get healthier. They may have their blood sugar get higher and higher from that. And that’s the issue behind that.

So to help to maintain or restore glycogen, it takes a certain amount of healthy proteins along with some good nutrients to support liver function. And then a good diversity of fibers and things that help the
flora to regulate the blood sugar. And help the liver repair itself.

**Dr. Brian Mowll:** So in the metabolism reset diet are these things that you discuss? Do you have a plan to obviously reset the metabolism and heal the liver?

**Dr. Alan Christianson:** For sure. Yeah, it’s a 28-day process. And I think about one big food category as like fuel. And that's the fats, the carbs. And even ketones and alcohol, they can act like a fuel. Then I think about the protein and about various essential nutrients. And half of this, the protein and the nutrients, you don't want to run out of. You want to get enough.

The other half you don't want none, but you want to limit. So that's the balancing act. Limiting the fuel and maintaining the intake of things that help to heal the liver.

**Dr. Brian Mowll:** Excellent. Well, this is really helpful and powerful information. Just understanding the importance of the liver in diabetes and metabolic health. I think is really crucial. So, Dr. Alan Christianson, thank you so much for being here and sharing this information.

**Dr. Alan Christianson:** My pleasure being with you Brian.

**Dr. Brian Mowll:** If people want to find out more about the book or the work that you’re doing where do they get that information?

**Dr. Alan Christianson:** Dr. Christianson.com or anywhere books are sold. We’re easy to find.

**Dr. Brian Mowll:** Okay. Excellent. Thanks again for being here.

**Dr. Alan Christianson:** My pleasure.
Dr. Mowll: Okay. So I’m here with Dr. Sarah Hallberg from Virta Health, Indiana University, and author, co-author of several, I think, landmark studies about type two diabetes reversal, pre diabetes reversal. So I’d love to talk to you about those and what you’re doing. So your model is using health coaching and ketogenic diets from a nutritional protocol. Why did you decide on that model?

Dr. Hallberg: Well, I’ll tell you. I mean, as far as carbohydrate restriction with type two diabetes, it’s well known that that is effective. And when you look at the literature out there, what definitely seems to be correlated is that the lower that you go in the carbohydrates, the more effective it is at diabetes improvement and reversal.

And so our nutrition in approach is built on really decades of research by two of Virta’s founders, which are Dr. Jeff Volek and Dr. Stephen Phinney. And so our nutrition approach with our patients who have type two diabetes or pre diabetes is carbohydrate restriction that is intended to induce nutritional ketosis. Now, the thing is, we live in a carb centric world, and we’ve been told to eat a low fat diet for a long time.

So telling someone to restrict their carbohydrates, explaining why physiologically that makes sense, is one thing. But leaving them alone to be able to implement this in all ways and aspects of their life, is something that is very challenging. And so what we have to do is bring
technology into the mix to help give people the support they need. I always say lifestyle changes are hard. If they were easy, everyone would do it. And so what we have done at Virta Health is we have brought the nutrition science in and technology to enable us to give patients the support that they need. And so this support comes in many different ways. They're supported by their individual health coach, who can help them with the nutrition recommendations that are very personalized.

It comes from the fact that they each have their own physician who's watching their blood sugars and reducing medications safely and effectively in close to real time. And these are both based on biomarkers that the patient is putting in to the Virta app.

So when they step up onto their cell phone and able to scale every morning, their health coach and physician can see what's happening with their weight. They enter in their ketones, they enter in their blood glucose and that allows the health coach to personalize the nutrition recommendations. And it allows the physician to make those medication changes, again, in close to real time. So the blood sugar gets entered, the physician can right away react to that, not the next week or next month when they go for an office visit.

And the health coach support is critical. But they're also able to be supported by their peers who are also going through the same thing. They have access to recipes and other resources and instructional videos. And even we have their own Virta cooking show with the health coaches that they know themselves. So many different ways to support people through sustainable changes.

**Dr. Mowll:** I think one of the most exciting things that you're seeing is people coming off of medication, because in standard conventional diabetes treatment, we usually see the opposite. We usually see over 5-10 years people who are on more medication. To get blood sugar, that's not even all that well controlled. So can you talk a little bit about how that happens and how your doctors are able to, or how you are able to help people come off of medications instead of going on more medications?

**Dr. Hallberg:** You know, I consider myself a specialist in nutrition and in diabetes, but really what I'm the specialist in, is I'm a deprescribing specialist. So we're not taught about that in medical school, all you're taught about is how to prescribe medications. But really what we do is we take people off of them. So deprescribing is a joy from a physician standpoint.

And of course, we know it’s a joy to the receivers who are the patients, who then get off their medications. And so when a patient puts in blood sugar, if their blood sugar has dropped from the day before, even
maybe the meal before, we come in right away, especially if they're on medications such as insulin or Sulfonylurea that we know can drop the blood sugar too low.

We have to be vigilant, ever vigilant with people until they get off of those medications. So when the blood sugar go in, we react. And like I said, being able to react in that almost real time, allows the safe and effective reduction of those medications.

**Dr. Mowll:** So it’s not just stopping medications irresponsibly, it’s tracking blood sugar. And as those blood sugars are coming down --

**Dr. Hallberg:** We’re simultaneously reducing their medications along with it, safe and effective.

**Dr. Mowll:** Exactly. And you’re right. I mean, this is what I hear day in and day out from new prospective client says, “I want to get off medications. I'm tired of taking more medications. I don’t want to end up on three or four different diabetes drugs.” So to be able to do that is really life changing.

**Dr. Hallberg:** It is, it really is.

**Dr. Mowll:** Now, you've talked about several different models that have been shown in the literature to reverse diabetes, could you talk a bit about those and then the model that you've chosen to use?

**Dr. Hallberg:** Yeah, so there are three clinically proven ways to reverse type two diabetes. That’s with bariatric surgery, a very low calorie diet and a low carbohydrate diet. And so you know, who should be making the choice about what people should be doing? And there's only one answer to that. And that's the patients themselves.

And so therefore, it becomes the responsibility of healthcare providers to understand all three possibilities, and be able to have a intelligent discussion, patient centered discussion with everyone that they see. So some patients may not even choose to go after reversal. But again, that’s their choice, but they will never choose reversal, unless they know it’s an option. So it’s, again, health care providers responsibility to understand that it can be done and then to really be able to discuss the options with their patients.

Now, I've chosen to utilize a low carbohydrate method. And I do that because I think that the fact that there’s not calorie restriction, the fact that people get help with their hunger and cravings, and people find it more sustainable, and it's very effective. And so I think most people will choose a low carbohydrate model. But I said most and not all. And again, patient choice is key.
Dr. Mowll: And what’s next for Virta Health and for what you’re doing, what’s on the horizon?

Dr. Hallberg: So the next is our three and a half year data collection, that’s currently ongoing. And so we look forward to the publication of our two-year paper and then our three-and-a-half-year paper, too.

Dr. Mowll: I’m sure the results are going to be astounding as they have been in the past.

Dr. Hallberg: We’ll see. I hope so.

Dr. Mowll: All right. I hope so, too. Dr. Sarah Hallberg, thanks for taking the time with me today. I appreciate it. If people want to find out more about Virta Health or what you’re doing, what’s the best place for them to go?

Dr. Hallberg: virtahealth.com.

Dr. Mowll: Okay, thank you.