THE MODEL HEALTH SHOW

EPISODE 708

Use This For Smarter Weight Loss, Appetite Control, & Better Brain Health

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SHAWN STEVENSON: Welcome to the Model Health Show. This is fitness and nutrition expert Shawn Stevenson, and I'm so grateful for you tuning into me today. On the surface, it appears that we've had an explosion in technology and innovations in human health and wellness. The United States does in fact, have over 4 trillion spent in healthcare annually, and this is according to the Journal of the American Medical Association. Yet, paradoxically, with all of our perceived innovations, we now have record setting levels of chronic diseases, infectious diseases, and debilitating mental health conditions. For instance, despite more advanced testing, access to more drugs and an abundance of industry backed education, rates of diabetes have skyrocketed in the US, nearly quadrupling, not doubling, not tripling, quadrupling in the last 40 years alone. This is according to a report published in the New England Journal of Medicine titled The Past 200 Years in Diabetes.

Now, diabetes and pre-diabetes are just two conditions that have reached epidemic proportions with nearly 130 million Americans now battling with these conditions. But there's a key metric within diabetes that crosses over into nearly every area of our health. It's a major controller of our cardiovascular health, our brain health, and even our body composition. That metric is our blood glucose or our blood sugar levels. And this metric is incredibly precise, provides invaluable information about our metabolic health, and most importantly, it is something that we can intentionally change, and optimize with the right information in our hands. This powerful episode is a masterclass on the science of blood glucose and metabolic health. And you're going to learn directly from the most renowned experts in the world on this subject. Being that we're in the midst of a great paradox, it's time that we start asking more intelligent questions, leading with more curiosity and openness, and most importantly, getting honest about the results that we're seeing.

Now, again, these are the leading experts in the world on metabolic health and blood glucose management. And we're going to kick things off with a segment from a conversation I had with biochemist, bestselling author, and the glucose goddess herself, Jessie Inchauspé. In this segment, you're going to discover how your blood sugar controls your hunger and cravings, how blood sugar impacts inflammation in your body, and why the relationship between blood sugar and insulin controls body fat storage. Now, again, this is just the first expert that you're going to hear from, but this is incredibly insightful and powerful. Let's check out this segment from the incredible Jessie Inchauspé.

JESSIE INCHAUSPÉ: So, when you eat starches or sugars, so starches being bread, pasta, rice, potatoes, cereal, grains or sugars, anything sweet from fruit juice to chocolate cake to a banana, those foods turn to glucose as you digest them. And so those glucose molecules make

their way into your bloodstream, and the concentration of glucose in your blood starts increasing. And the faster it increases, the more it increases, the bigger the glucose spike that happens after that meal. And so, when a glucose spike takes place, there's a few bad consequences in the body. Number one, it increases inflammation. Number two, it increases aging. And number three, what happens is that your body produces insulin, sends out insulin from your pancreas to store away that extra glucose.

SHAWN STEVENSON: To clean it up out of our blood stream.

JESSIE INCHAUSPÉ: Essentially, yes, to protect you, because if glucose stays too high for too long, a lot of damage starts happening to your cells. So, your body with this very important insulin, grabs the extra glucose and stores it away, and that's the relationship. Insulin then is released in response to these glucose spikes.

SHAWN STEVENSON: Yeah, it's like, it's so incredible, the intelligence of the body.

JESSIE INCHAUSPÉ: I know.

SHAWN STEVENSON: But over time, doing that again and again is kind of chronic glucose spikes and crashes.

JESSIE INCHAUSPÉ: Oh yeah. And so, let's talk about the crash. So, when insulin puts glucose away, then your glucose levels start going down, and so they decrease. And if they decrease too quickly, sometimes because your body is just sending out too much insulin, then you experience a crash below baseline. This increases cravings, hunger, fatigue, all sorts of symptoms that many of us think are just normal, right? We just think it's normal to crave something sweet two hours after a meal. We think it's normal to be tired at 10:00 AM and 3:00 PM. That can often just be the result of a glucose crash happening because your previous meal led to a spike, therefore a crash. And so, I like taking the image of people being a high functioning glucose rollercoaster.

So, a lot of people, they go spike, drop, spike, drop, spike, drop all day, and they manage these symptoms with caffeine, with eating sugar to sort of combat the fatigue and the hunger they're feeling. But overall, they're really victims to that rollercoaster. And on the inside, the longer the rollercoaster goes on for, the more damaged your mitochondria become. Your mitochondria are the things responsible for making energy in your body. And so that can lead to chronic fatigue, among many other symptoms. And so my whole work is to teach people to step off that rollercoaster and steady their glucose levels so they can get back to thriving physically and mentally.

SHAWN STEVENSON: With insulin being active, we're essentially having this signal of energy storage. And so, we're definitely not burning fat at this point, because insulin is...

JESSIE INCHAUSPÉ: Yeah, when there's insulin around, your fat cells become one way. So, stuff can get in, but nothing can come out. So, when there's a lot of insulin around, it's like your body's like, okay, we're in storage mode. We're not in fat burning mode. We're in fat storage mode.

SHAWN STEVENSON: Yeah. Now, there's a couple of things to unpack here in this glucose body fat equation. So, you already mentioned the impact we have with insulin. You said this in passing. You said inflammation and inflammation is a huge, kind of goes hand in hand with being overweight and obese, and a lot of people aren't talking about it. So how does blood glucose or these chronic spikes impact inflammation?

JESSIE INCHAUSPÉ: There's two mechanisms. So, the first one is that, when a lot of glucose arrives in your cells, it goes to your mitochondria, because that's where it's supposed to be transformed into energy, so glucose goes straight there. Unfortunately, when a glucose spike happens, and you're delivering too much glucose to your mitochondria, your mitochondria just kind of shut down. They go like, whoa, too much glucose, cannot deal, and they just like stress out, and they're like, no, cannot. And when they are in that state of stress, they produce what's called reactive oxygen species, which are very small molecules that have very damaging consequences. They can snap your DNA, they can poke holes in the membranes of your cells, and they can damage a cell so much that the cell becomes what's called under a state of oxidative stress, which just means the cell is damaged. And when that happens, that leads to inflammation in the body.

So that's the first pathway. And you mentioned it like inflammation is so key. The World Health Organization says that three out of five people today will die of an inflammation-based disease, three out of five people. The second pathway is that, well, actually, there are three, but the second pathway is that the more glucose is in your body, the faster glycation is happening. Glycation is the process of aging. It's also similar to the process of cooking. Like when you put a chicken in the oven and it goes from pink to brown, it's being glycated, and the human body slowly glycates from the moment you're born. And then when you're fully glycated or fully cooked, you die. Okay? That's aging. The more spikes you have, the faster that process happens. And that process also increases inflammation in the body. And then finally, insulin itself is inflammatory when there's too much of it. So, you end up in a state of chronic inflammation, which just has so many damaging consequences to the body. And if you look at like Alzheimer's, heart disease, Type 2 Diabetes, whatever, like acne, eczema, psoriasis, like all diseases, all chronic diseases usually have an inflammatory base. And so the higher

inflammation is happening in your body, the more likely you will develop it and the worst they will get if you already have them.

SHAWN STEVENSON: Oh, my goodness. So, the last component in this kind of weight gain, fat gain equation I want to talk about, and you said this in passing as well, is the craving a aspect.

JESSIE INCHAUSPÉ: Yeah. This is fascinating.

SHAWN STEVENSON: And you shared this in the book in 2011, a research team from Yale University uncovered new insights about cravings by placing people into an fMRI scanner. Talk about that.

JESSIE INCHAUSPÉ: Oh yeah, I love this study. It's one of my favorite ones. Shout out to these amazing scientists that we learned so much about, learned so much from. So, the scientists took participants and they put them in an fMRI scanner. And while the people were in the scanner, they, one were measuring their glucose levels, and two, they were showing the participants photos of "high calorie foods" that people often crave, like burgers, chips, cookies. And they were asking the participants to rate how much they wanted to eat the food. So how much they were feeling a craving for that food. So amazing. And the scientists were also looking at images of the brain scan going on to see what they found. When the people's glucose levels were normal and steady, they didn't really rate any of the foods highly. They were just like, meh, burger, meh salad, meh cookie meh.

However, when their glucose levels were low, which can happen after a spike, remember spike crash, then all of a sudden, the participants were rating the cookies and the burgers much higher on that scale, and the scientists saw that the part of their brain that is in charge of cravings started activating. So that low glucose levels was activating the biological response of craving. And so that's what can happen when you are on this glucose rollercoaster. You feel these strong cravings for sweet foods. And if you're feeling that, trying to resist them with your willpower, like you're going to lose, don't even try. Your body's ancestral programming is telling you from really deep inside your brain to go and find something that has a lot of calories in it. So, the solution is not like to feel guilty or ashamed about this or to try to fight against it, it's more fixing the root cause so that naturally, they go away.

And sometimes, I mean now, I never have anything in the morning that creates a glucose spike, but sometimes, rarely, I don't know why, but I'll just want to eat something sweet in the morning. And then inevitably, my whole day is this big rollercoaster, and I feel cravings all day. And it's just so amazing to experience that. It's just like clockwork. You eat something that creates a spike in the morning for breakfast, bam, two hours later, you want a cookie, bam, two hours later you want like pasta or burger. It's just, it's the programming in your brain.

SHAWN STEVENSON: Now, as noted, our blood sugar is something that we can track in real time today. Something that provides personalized data on how various foods influence us, which by the way, is likely different from other people. We all have a unique metabolic response to the foods that we eat. Also, our blood glucose can indicate how things like stress and sleep influence our body's blood sugar management and so much more. For this valuable information on tracking our blood glucose that's helping hundreds of thousands of people improve their metabolic health, I personally use Levels. Levels, shows us in real time how food affects our health through continuous glucose monitors, and Levels actually provides us with access to continuous glucose monitors and the incredible Levels app that pairs with continuous glucose monitors to give us our own personalized data again, in real time.

Now, utilizing Levels myself, one of the things I was most surprised by was how my wife's response to different foods was so different than mine. My wife's data from Levels showed that she is the one in our relationship with very consistent blood sugar levels, pretty much regardless of the type of food that she eats most of the time. But certain foods would throw her off far more than me. Certain foods would send her blood sugar spiking and then crashing that didn't have the same effect when I had those same foods, nor did I typically have big, extra big spikes and crashes but I definitely had more consistent, notable ups and downs than she had, which she was generally more stable throughout the day.

Now again, the crazy thing is the Levels app was affirming how we were feeling if we actually were paying attention to our bodies. She could see that when she had those carb munching moments during the day sometimes, and then felt tired afterwards, like she just had to take a nap or couldn't keep her eyes open, when she would go back and look at the Levels app, she could see that that coincided with a spike and a plummet. And again, when she checked the app, it showed exactly how she was feeling. Now, right now, Levels is providing listeners of the Model Health Show, a very special offer. If you go to levels.link/model, that's L-E-V-E-L-S.link/model. If you go there right now, they're going to give you several months for free with their annual membership. So, check it out asap. Again, I don't know how long they're going to be doing this special offer, but it's incredibly valuable. And utilizing this data, again, it's one of those things where we place the continuous glucose monitor on the back of your arm or some folks place them other places on their bodies, but you can do your daily normal day-to-day practices, showering, exercising, working, and it's just going to continuously feed your blood glucose data to the Levels app, and it is so remarkable. Now, again, check it out asap.

They also have a really incredible, it's one of the most science backed sites that I've come across with in-depth information on the Levels blog, which I recommend checking out as well. Learning about topics regarding metabolic health, longevity, and a lot more. But again, to take advantage of this incredible offer, go to levels.link/model and get this hookup. All right. Now

moving on in our Blood Sugar Masterclass, you're going to hear from Dr. David Perlmutter, and he's a board-certified neurologist, and six time New York Times bestselling author. He also serves on the board of directors and is a fellow of the American College of Nutrition. And in this segment, you are going to learn the critical connection between blood sugar, Alzheimer's disease, and overall brain health. Check out the segment from the incredible Dr. David Perlmutter.

DR. DAVID PERLMUTTER: So, we began suspecting that blood sugar was an issue about a decade ago. And since then, we've seen some really nice research one from a Dr. Rose Budd Roberts at Mayo Clinic publishing demonstrating that when you look at people's diets, those individuals with whose most favored carbohydrates as a calorie source have about an 88% increased risk for Alzheimer's disease, a disease for which there is no treatment. Those whose diets favored higher levels of fat, the dreaded fat as a calorie source actually had about a 44% reduction in risk for, again, Alzheimer's disease. And that really from a dietary's perspective frames in where our discussion can go. And that is that a diet that's rich in carbohydrates and especially simple carbohydrates is one that ultimately leads to insulin resistance and elevated blood sugar. The brain absolutely does not tolerate elevations of blood sugar, even subtle elevations of blood sugar.

An outstanding report appeared in 2013 in September in the New England Journal of Medicine, arguably one of the most well-respected medical journals on the planet, it was a very interesting study that took several thousand individuals. And at the beginning of the study, they did a brain, a cognitive study to determine how well their brains were working, and they did one other test. They measured their blood sugar. About six and a half years later, they came back, and they said, okay, we're going to examine your brain function. And then they said, who had dementia by now, and who did not? And what they found was a powerful direct correlation between even subtle elevations of blood sugar, and risk for dementia. And what was really interesting is in the conclusion, they stated that even mild elevations of blood sugar, well within the range of what your doctor is going to say is a normal blood sugar is already associated with elevation of risk for dementia.

So, you can have a blood sugar of 105 and your doctor gives you a pat on the back and says, don't worry about it, you're not diabetic, everything's cool. You know what, it's not. According to our most well-respected research, it's not cool at all. You already have an increased risk for disease that has no treatment. Our mission is to get that information out to everybody, to empower them to make choices. The idea of having a blood sugar being okay at a 100 to 105 is not good enough. While that might be considered normal, Shawn, for you and me and your audience and for everyone, we want people to be optimal, not in the normal range. The normal range is a completely contrived idea based upon statistics in terms of what we call standard

deviations. I want everybody to know what's best for their brain, and the lower the blood sugar, the better the insulin sensitivity, the better it is for your brain.

Now there are many mechanisms that relate this elevation of blood sugar to damage in the brain. And I think probably, one of the biggest players is when your blood sugar is elevated, that blood sugar binds to proteins. We call that glycation. As a matter of fact, many people don't know it, but they're probably very familiar with this because of the blood test called A1C. If you watch the evening news, you see all these advertisements for people who are generally overweight and should be on a higher fat, lower carb diet. But anyway, they're taking drugs to lower their A1C. What is A1C? It's sugar bound to a protein, in this case, hemoglobin. So, it's called the hemoglobin A1C. The level of A1C directly correlates to the degree of brain shrinkage on an annual basis, and that degree of shrinkage outperforms the amount of brain shrinkage you get, even if you carry the so-called Alzheimer's gene.

Why that's important is because, you can't take the diving board off your gene pool. You can't rewrite your genes you got from your parents and all who came before you. But what we now understand that you can change your gene expression, you can change the very expression of your life code. We know that about 70% of our DNA, that codes for health and longevity is under our direct control by changing our lifestyle, by eating appropriately, by gaining exercise, making sure our sleep is restorative by limiting stress, we can pave the way for a healthy brain. And that's very, very empowering especially when we know that we have no treatment for our most dreaded brain condition, that being Alzheimer's.

SHAWN STEVENSON: Yeah. Wow. It's incredibly empowering. At the same time, it's very sobering just for us to kind of like look at some of this and some of the confusion, especially when it's related to our blood sugar and how much that impacts our brain. In the book you say that, and so of course our blood sugar, one of the big players is insulin, which is an incredibly important hormone, we tend to think about diabetes in relationship to this. But you say insulin doesn't just escort glucose into our cells. It's also an anabolic hormone, meaning it stimulates growth, promotes fat formation and retention, and encourages inflammation. And all of those things are detrimental to our brain.

DR. DAVID PERLMUTTER: That's right. And everybody recognizes insulin for what we all learned about. And that is it's what is secreted by your pancreas to lower your blood sugar after a meal. Okay, great, but I think that Gary Taubes has done an excellent job in writing the book, Why We Get Fat and What To Do About It, really explaining that insulin has other very important roles in human physiology. And most importantly, as you well mentioned, it stimulates what we call lipogenesis, the creation of fat, and it inhibits lipolysis, the breakdown of fat. And that is a great thing because it allowed us to survive. When we, as hunter gatherers would find in the late summer blueberries, we would eat the blueberries, the sugar would be in our bodies,

raise our blood sugar, stimulate insulin, we would lay down fat and we could survive throughout the winter of caloric scarcity.

Problem with that mechanism is, it's still in play, and people are catering to that mechanism 365 days a year for the winter that never shows up. So, hunting and gathering isn't hunting down the convenience store and gathering up the corn chips, it really is being active and on a diet that's higher in fat and protein and remarkably lower in sugar and carbohydrates. So getting back to this notion of changing gene expression, what has been, I think the most appending event in my professional career in terms of discoveries have been two, as a matter of fact. First, the notion that we can change our gene expression, and second is something you alluded to just a bit ago, and that is that we have the ability to continue growing brain cells, to regenerate and repopulate our brains throughout our lifetimes.

And certainly, that is something that was not taught to me in medical school in the 1980s. We were told you got a certain number of brain cells and that was it. And it was pretty much we were on the skids after age about 18. It was a one way and that was downhill. But we know now, through the work of Dr. Peter Erickson, published only in 1998, that humans retain the ability to repopulate our brains with new brain cells throughout our lifetimes. Even into our senescence, we have the ability to grow new brain cells. And this growing of new brain cells is one way to stave off dementia. And it's under our control. Now, your audience is probably on the edge of their seats right now, like I am, wondering, "Well, what in the heck can I do to make that happen? How do I enhance the growth of new brain cells?" And I tell people, there's something you have to buy. And here's the pitch, you've got to go out and buy a new pair of sneakers. That's it. And you can get any brand you like. So this is non-denominational.

Why is that so important? Because as we've learned from work at University of Pittsburgh, a collaborative study with UCLA, that probably aerobic exercise is the most powerful way that we can change our gene expression and flip on the switch, it turns on the gene that makes a chemical called BDNF that grows new brain cells, levels of BDNF correlate to reduced risk of dementia, levels of BDNF correlate to better memory, and as we just learned a couple of months ago, low levels of BDNF in women are strongly associated with risk for suicide, so this is a very, very important growth hormone, that we can increase in our bodies by spending some time walking, dancing, on the elliptic machine, swimming, biking, whatever it is that you can do to get your heart rate up and do it every single day. This may be associated according to the conclusions reached by Dr. Erickson and his team, may be associated with a 50% reduction in risk for Alzheimer's disease. Wow. So I gave this talk just yesterday.

SHAWN STEVENSON: Yeah.

DR. DAVID PERLMUTTER: And I paused at that point, and I didn't want to ask how many in the audience have ever heard of that, 'cause I know very few hands would go up, but I said, "You guys have spent these two hours with me today, I am going to close the door until each and every one of you promises that you're going to take this to heart and make changes." A lot of times, when you give lectures, I know you know this. Somebody... A lot of people will say, "Oh, I heard Shawn today, it was really interesting." But that's as far as it gets. I want action. I really do. That's the mission. It's your mission too is, we're giving out this incredible information, that's halfway, the other half is, okay, then your audience gets it, they've got to act on it. And this is knowledge that is hugely, hugely empowering.

SHAWN STEVENSON: Yeah, as simple as that, the only thing you need to buy are some new shoes, so whether it's the Nikes you guys are rocking, or Skechers, or if it was like me when I was a kid, I wanted my mom to buy me some Pumas, and she literally bought me Panthers. All right? True Story. All right? The Panthers do exist, it is an off-brand shoe, and I strangely accidentally stepped in a bucket of paint, and I was like, "I can't wear these no more, mom." So that's oh so powerful just to understand...

DR. DAVID PERLMUTTER: I would've have worn them after the paint, they probably looked great.

SHAWN STEVENSON: Right. Especially today, especially today. But it's so powerful to know that how much exercise can influence whether or not we have this, again, this is something that, if you look at the research, you see about 100 million people over the next 30 years being impacted by Alzheimer's, this does not have to happen, and that's an incredible insight. And by the way, when you talked about kind of... And you talk about this in the book as well, our thrifty genes and how we're kinda hard-wired for this feast and famine situation, but today we don't even hunt, and you talked about hunting, maybe going to the convenience store, and hunting down some corn chips.

I picture like a guy wearing a loin cloth with the spear walking into 7-Eleven, that would be hilarious, but that's the extent of what we have to do to get our food, is most of the time just walking into your kitchen, and so, wow, this is profound, and also really quickly, I want to point to, and I just mentioned this in the conversation that I just had on the Dr. Oz Show about Alzheimer's related to sleep deprivation, and one of the things, because these are TV segments, we didn't really get into, is how much insulin resistance from sleep deprivation influences our risk of Alzheimer's, because even just one night of sleep debt can create... Make you look like you have blood sugars as though you were a Type 2 Diabetic, or at least insulin-resistant. And your brain can have this kind of situation where it's insulin resistant as well, we see about 14% reduction in brain activity and also kind of circulation utilization of glucose by the brain when you're sleep deprived, so tying all this together.

DR. DAVID PERLMUTTER: That's right, in my newer book, which is based on Grain Brain, called The Grain Brain Whole Life Plan. I talk about the importance of sleep and talk about how I, as an adult, but also as a guy whose father died of Alzheimer's disease, felt that... I didn't know how well I was sleeping, so I went and had a sleep study as well, and everything came out okay. But I think people should do that, you cannot underestimate the power of a good night's rest, that's when the brain consolidates memory, and at the same time activates what's called the glymphatic system to clear debris. But the people that we're talking about are people who are snoring, who have sleep apnea, or periodic leg movements, whatever that, are waking them up, drawing them out of restorative sleep, and they are dramatically increased risk for Alzheimer's, and certainly insulin resistance and diabetes. And let me just make this very important correlation, in a country that has 23 million confirmed diabetics already, where one-third of adults are pre-diabetic and, on their way, to really and fairly significant illness. My interest is in the brain, and that relates to diabetes because if you become a Type 2 diabetic, and think of those statistics I just revealed, you have doubled your risk for Alzheimer's, again, and I'll repeat it, a disease for which there is no treatment. The reason I keep repeating that is, again.

We live in this society where we're pretty much told, do whatever the heck you want to do, and when you suddenly come down with a problem, there's a pill for you, and as you and I have this conversation, there is no treatment, there's no magic pill that can help you with your Alzheimer's, that will reverse this condition, it doesn't exist. Am I in favor of drug research? You bet I am. I think it's great, but I think... There's a quote from Albert Einstein, it says, "Intelligent people fix the problems. Geniuses prevent them."

SHAWN STEVENSON: Yes.

DR. DAVID PERLMUTTER: And John Kennedy said that "The time to fix the roof is when the sun is shining." And I think that's where we are. But what we're doing here, as a physician, what I'm doing, is I'm hitting the ball back across the net to the other side, and that means the responsibility is going back to you, everyone who's watching this interview, that your doctor has nothing for you, in terms of treating your brain if you have Alzheimer's, and you could be well on your way, the changes that begin in the brain, before you can't find your keys or forget the WiFi code, or go into the room and don't know why, those changes begin 20 to 30 years ahead of time, so we've got to get you exercising this afternoon, tomorrow, we've got to make it happen, we got to get your blood sugars down, we're going to lower your insulin levels, you got to get your hemoglobin A1C down into the low fives, all of these things need to be maximized, Vitamin D level in the optimal range, all important, and you know it's not like there is an Alzheimer's diet. Like there's a heart smart diet or an osteoporosis diet. They're all the

same. Can you imagine that you have to pick the diet and pick the disease that you don't want to get and take your chances on all the rest.

No, the same diet is involved in reducing inflammation, that is good for your heart, good for your cancer risk, good for your risk for diabetes, because those are also inflammatory conditions, Alzheimer's, heart disease, diabetes, cancer, multiple sclerosis, Parkinson's, they're all inflammation-based diseases, so when we lower our sugars, and we increase our healing fat, and we exercise and sleep appropriately, we're dropping down these inflammation numbers in our bodies, and that's good from the top of your head to the bottom of your feet.

SHAWN STEVENSON: And I hope that you enjoyed that segment from Dr. David Perlmutter, and he referenced this incredible compound called Brain-Derived Neurotrophic Factor, and there are many different implications for this compound that we naturally produce in our own bodies, for longevity, for cognitive function, for overall protection of our brain health. It's often referred to even by scientists as Miracle Grow for our neurons, which is pretty remarkable, but as mentioned, having high blood glucose suppresses BDNF, it suppresses Brain-Derived Neurotrophic Factor, as a matter of fact, a study that was published in 2006, titled Brain-Derived Neurotrophic Factor and Type 2 Diabetes showed this link very clearly that, again, when we're constantly walking around, spiking our blood sugar, or having continuous high blood glucose levels, it's suppressing this protective effect that we could be having with BDNF naturally, and on the other side of things, increasing BDNF can potentially directly lower and normalize blood glucose when subjects have pre-diabetes and other blood glucose-related diseases, so again, doing things that proactively increase BDNF, and this is noted by the way, by the International Journal of Molecular Sciences in a study that was titled Brain-Derived Neurotrophic Factor and Diabetes, and so we have all of these incredible tools at our disposal.

As Dr. Perlmutter mentioned one of the best investments for our brain health and a defense against Alzheimer's and blood glucose derangement is a pair of running shoes, getting a pair of shoes to exercise in, and because exercise is truly remarkable when it comes to managing our blood glucose and protecting our brain health. And moving on in our compilation, next step, we've got one of my favorite people in the world, she is absolutely brilliant and just one of the sweetest, most thoughtful and kindest people that I know in this field, and I'm talking about Dr. Cate Shanahan. Now, Dr. Shanahan is a leading authority on nutrition and human metabolism, she's a board-certified family physician with over two decades of clinical experience, she's a New York Times bestselling author, and she's also worked with cool, I mean, cool situations like being the nutrition specialist for the Los Angeles Lakers, no big deal. Helping to educate Kobe Bryant and helping to extend his career, just a little, a little sidebar there, but she's done some incredible and truly helped countless people with her knowledge and insights. And in this segment, Dr. Shanahan is going to be discussing how constant blood

sugar highs can damage our tissues and even mildly high blood sugar levels can be devastating to our health long-term. Check out this segment from Dr. Cate Shanahan.

DR. CATE SHANAHAN: So, sugar is sticky. So if you've ever had jelly or cleaned a baby space, it's sticky because the sugar molecules actually start to bond with the protein on your skin, so when you touch your skin and pull it apart and you feel like a tacky resistance there, that is actually a reflection of how sugar behaves inside your body as well, it starts bonding to things, it's like swallowing glue, basically, and it starts making all your tissues stick and malfunction, and so that is extremely disruptive, and obviously, and if you pour glue all over the inside of an engine in a car, you can't imagine it working or inside your kitchen, it's, the cabinets are going to start sticking closed and nothing's going to work.

Well, the same kind of thing happens within your cells, and within the tissues between your cells, and so the body has to regulate the blood sugar level to prevent that from happening, and that body works so hard to regulate this level. We have at least a dozen hormones that do this. Insulin is the most famous, then there's a glucagon, that's another one, but growth hormone and pretty much every hormone you've heard of actually play a role in pushing insulin levels either up or down, depending on whether they're a growth kind of a hormone, a storage hormone, or an energy-releasing hormone. So, we do have a need for a little bit of sugar, but the amount in our bloodstream is a total... The total amount in our bloodstream is at three-quarters of a teaspoon, you can imagine if you're drinking a soda that has something like 22 teaspoons in it, that...

SHAWN STEVENSON: Wow.

DR. CATE SHANAHAN: Your hormones are going to go haywire trying to control all that, and after a while of all that sugar highs and hormones being released, the system essentially wears out, and this is how people start to get pre-diabetes and diabetes, and then diabetes... Once you have diabetes, you cannot control your blood sugar levels anymore, and then that toxic stickiness starts to cause all the complications of diabetes, which we know are... We get... People get nerve damage so that they can't feel their feet, and they often get amputations from infections, they get kidney damage, these are well-known, and blindness, but another one that we've just recently entangled is Alzheimer's has a lot to do with elevated blood sugar, so even before you're diagnosed with diabetes, your blood sugar is constantly a little too high and it damages the nerves in your brain, and so it can cause memory and learning problems.

SHAWN STEVENSON: Man, that's so fascinating. This is... And there are several experts referring to Alzheimer's as Type 3 Diabetes now, because of that profound impact.

DR. CATE SHANAHAN: Yeah, I think that's a really catchy way to think of it, but I always like to remind people that it's before you have diabetes, right? That it's not just once you get diabetes, it's even before. So one of the most important numbers that I want people to know when they go to their doctor and get an annual physical, the doctor always tests the fasting blood sugar, and more than half the time, when the number has come back slightly elevated, and then I see the person, the doctor never told them, because we don't learn the profound problems that are resulting from this mildly high blood sugar level that we call pre-diabetes or even just like hypoglycemia, like a lot of folks have noticed that they get shaky or week when they get hungry, they feel like really like brain foggy and bad, and they call it hypoglycemia, that is a precursor to pre-diabetes, and that's telling me that your body is not able to regulate your blood sugar properly anymore, and that's already a problem.

SHAWN STEVENSON: All right, next up in a Blood Sugar Masterclass, we have the incredible Cynthia Thurlow. Not only is she a best-selling author, but Cynthia has been a nurse practitioner, for over two decades, she's done some of the biggest TED Talks on health-related topics ever viewed on the TED platform, and today she's one of the globally recognized experts in nutrition, intermittent fasting, and overall human health and wellness. So, in this segment, she's going to be sharing with you the connection between blood glucose and our hunger and satiety hormones, and how the processed food industry has hijacked our food habits and our blood sugar, plus the surprising way that intermittent fasting influences your blood sugar. Check out this segment from the amazing Cynthia Thurlow.

CYNTHIA THURLOW: The processed food industry has really convinced people that having these nutrient-devoid, carbohydrate-dense processed foods are somehow going to stabilize their blood sugar. It's going to do exactly the opposite. And so when I like to talk to people about the concept of meal frequency and "stoking your metabolism," it is completely the antithesis of what we've been taught, and if we really understand that the way to support our metabolism is to keep our blood sugar stable, and the processed food industry, most of what they're peddling is doing exactly the opposite of that, and so when I talk to people about when you get up in the morning, most of us, our hunger hormones are actually suppressed, we actually shouldn't be hungry in the morning, maybe an hour or two later, we may get a grumble, but that is sometimes often a reflection of dehydration, it's not even that you're intrinsically out of gas and need more food, and even thin people have plenty of stored resources in the body, stored fat that their body can actually break down and metabolize and use, and so what we've convinced people to do is to eat these highly processed, hyper-palatable, have your orange juice, have your sugar-sweetened cereal, have your sugary yogurt, go about your day, have the skim milk, even, go about your day and wonder why two hours later you're starving.

You're craving that frappuccino, you're looking for a candy bar, you're eating that granola bar, you're doing things that are further destabilizing your blood sugar. And so I think when we talk about breaking your fast, breaking your fast could be with real food, but we've convinced people that we need to have muffins and cereal and protein bars, they're really candy bars in disguise, and that has contributed to this ill support of our metabolism, and further blood sugar dysregulation, and I think the other piece of it is, in our bodies, in order to actually tap into fat stores to use as energy, our insulin levels have to be low, and so what's happening is if we're eating constantly, and there was actually a great study that came out last year really looking at meal frequency, and people were eating 6-10 times a day, not 2-3 times a day, and so, as I mentioned, insulin is not a bad hormone, but if your insulin levels are up, you can't tap into these fat stores, you're going to struggle with monitoring and stabilizing your blood sugar, you're not going to be able to effectively utilize either stored glucose or stored fats, you're going to be stuck in this perpetualization of being hangry, struggling with energy, falling sleep after a meal, weight loss resistance, all the things that are really becoming, unfortunately, more than norm than they should be.

SHAWN STEVENSON: Yeah, of course, we're going to talk about the benefits seen with having more structured eating, intermittent fasting, and you've really been a pioneering voice in this, in recent years, which is so wonderful to see, but I love that you brought up the marketing angle of this, because I don't think that we really think about, like where did this concept really come from? Who's profiting from this concept? What are we eating? And by the way, everybody, I'm not taking away breakfast, if you just have a breakfast vibe, this is not the mission, it's to clarify even how we define breakfast, in our country today, right now, and not just here in the United States, but where the king of sugar breakfast is cereal, you mentioned the corn flakes, and I can't help but think about the guy who invented them, Dr. John Harvey Kelloggs, and his intention was to reduce your sexual desires, and this is not a joke, we talked about this here on the show, and understanding the impact that this has on insulin, in our insulin sensitivity and our blood sugar and all this stuff. Pop-Tarts, muffins, I love the little mini... When the mini muffins came out, I was all over it.

CYNTHIA THURLOW: In the little package.

SHAWN STEVENSON: The little, cute little package. Dunkin'... The little Dunkin' Stix and donuts and pancakes, and all these sugary, literally, we're starting the day, and by the way, these are all new inventions, these things have not been along very long, in human evolution. And so, and you just mentioned, replacing that with real food and in comes this... Yeah, you might have some neurological association or even addiction to getting up and piling some sugar in your body.

CYNTHIA THURLOW: Well, and I think the other thing is, if you look at the science, the processed food industry has food scientists that make these foods as desirable as possible, they call it a bliss point, there's a great book called Salt Sugar Fat, which I'm sure you probably have read, and you listen to the food scientists talk about, they bring in people to do trial and error, where's the point of how much sugar we need to add to something, or the right balance between fat and salt and sugar to get it to the point where people can't stop drinking it or eating it. And so, I remind people all the time that one of the things that starts to happen, is that it is not a lack of willpower, it's not a lack of follow-through, it's that your brain has been hijacked by these hyper-palatable, highly processed foods, and that is sad.

SHAWN STEVENSON: Yeah, to say the least. Wow, so powerful. So in your book, in this wonderful book, and I love that you share your story in it as well, kind of kicking the book off and just your experience, and we'll get to that too, but you talk about one of the most attractive benefits, especially for our culture, that's very, it is what it is, we're kind of a little bit more tilted towards vanity and everybody wants to look good, so appealing to that piece, but were missing out on something incredibly valuable because you even have the experience of really trying to sort your own weight out and to get your health on track, and many people are trying to do the same thing and doing basically, again, popular marketed things of calorie restriction and exercising our face off, but there's something really interesting that happens in the process of fat loss when you have a fasting window. And by the way, you articulate this too, this could be, you finish dinner at say, 7:00 PM, and then you have a 12, or 14, 16-hour fast, and maybe you're having your first meal at 10:00 AM the next day, or whatever the case might be, but within that frame, some really interesting metabolic shifts take place, so let's talk about how this can be impactful for the goal of actually utilizing stored body fat for energy.

CYNTHIA THURLOW: Yeah, it's a really good point because as, as you said, a lot of people come to intermittent fasting 'cause they want to change body composition, they want to lose weight. But I always say there's so much more to it than that. And if you really look at the science of things like autophagy, which is this, process where in an unfed state our body can go in and grid of disease, disordered organelles and cells that could otherwise go on to develop disease. I think that's a really important point and it's giving our bodies time to digest our food. We have gotten so far removed from having periods of time when we're not eating that I think on a lot of levels people are surprised that all of a sudden, autophagy is something they've never even considered. But how many people, if you look at cultures that are eating less frequently, they go on to live much longer lives.

So, I think about that. I think about a reduction in inflammation. And inflammation is not per se a bad thing. Inflammation in acute phase, you break a leg, you cut yourself, acute inflammation goes on to heal your body. But chronic inflammation, which is what we see with oxidative stress and insulin resistance and diabetes and high blood pressure, I mean all these,

chronic disease states. And then really thinking about, beyond that, improving all these, metabolic markers. So, when you're in an unfed state, your body will allow your insulin to come back down so your body can go in and, pull out the stored fat. And all of us have stored fat, even if you're thin. We have plenty of it. Plenty of it will allow us to go days without eating.

But it's just, it's the unpleasantness of, not having these, having these periods of time where you're not eating. But I also think about how many people start intermittent fasting and their blood sugar gets better, their cholesterol panel improves, their blood pressure goes away. How many people start having improved cognitive benefits because they have all this mental clarity? Because when insulin levels are low, our body can go in and free up specific types of fatty acids. It can go on to diffuse across the blood-brain barrier like ketones that allow us to be much more mentally clear. And I think that's probably the biggest benefit that people don't realize until after they start fasting and they're like, oh my gosh, I have so much energy, so much mental clarity. I can get so much accomplished when I was otherwise fixated on, what's the next thing I'm going to eat?

SHAWN STEVENSON: One of the resounding messages here in understanding how to master and manage our blood glucose is the influence that we have today of ultra-processed foods. Now ultra-processed foods are these newly invented food-like products that food scientists and processed food manufacturers have collaborated on to create really interesting chemical complexes that help the human brain or should I pull back the word help but influence the human brain to consuming more very dense, very kind of inflammatory or excitatory compounds in foods that would normally create a rapid satiety response because the human brain is really wired up in such a way that we can't consume a lot of a really intense flavor. We'll start to have this satiety reflex that starts to diminish our desire to eat those things. Or even like we'll start to feel, and you've experienced this over time, you'll start eating something and it tastes really amazing if we're talking about real food by the way.

But each successive bite tends to be a little bit less delicious, a little bit less attractive because our body, those satiety hormones are getting turned on and the food is starting to become a little bit less attractive. Whereas with ultra-processed foods, we can bypass or hijack that system and really stimulate and target this bliss point. But there's this phenomenon called vanishing caloric density where these foods essentially just kind of evaporate. If you think about a Cheeto for example, or eating some Doritos, and they turn into almost nothing as we allow them to kind of melt in our mouths and our brain is picking up like I just consumed something, but it didn't seem to be a lot of that thing, so I'll just have another, and they'll even frame the marketing as I bet you can't eat just one, right? They're not kidding. It's engineered that way.

It's designed that way to manipulate our brains to want to eat more and more. And so, these are in the category of something called hyperpalatable foods. All right? So, they're not just palatable and tasty. Hyper means extra. Hyper means extraordinarily. Hyper means a lot. How many chips you eat, a lot, how many health problems do you have? A lot, right? Shout out to 21 savages. All right, so what can we do to take control of our brains again, what can we do to take control of our biology? Well, obviously we're targeting many of these things here in this episode, but right out of the gate, what's something we can add in from the nutritional front that can help to recalibrate our palette? Well, a study that was published in the peer-reviewed journal Appetite found that chlorophyll, so this is the green blood essentially of plants chlorophyll can assist in weight loss and reduce the urge to eat hyper palatable foods.

Again, this is the most prominent peer-reviewed journal on hunger and satiety that is stating this. Now, chlorella also contains really remarkable compounds like lutein and zeaxanthin. These are keratinoid that are proven to protect our cardiovascular system and even our vision from degeneration. Super remarkable. But as I alluded to earlier, blood glucose tends to be put into a pithy box associated with diabetes and we're talking about disease orientation, but blood glucose and blood pressure is all in the same blood, right? It's all within the same system. Our blood glucose deeply influences cardiovascular disease. A lot of folks that have pre-diabetes and diabetes actually lose their lives or have severe outcomes from cardiovascular events due to high blood glucose. Now, a double-blind placebo-controlled clinical trial published in the journal Clinical and Experimental Hypertension found that one of the most chlorophyll dense foods ever discovered called chlorella was able to normalize blood pressure of test subjects with diagnosed hypertension.

Alright? You aren't without solutions when we're in these conditions, when we're in these disease states, these are just conditions. We get this diagnosis, we get slapped with the label, and then we tie our identity to the thing. I am a diabetic now, like I didn't have it, but I had the onset of it and we attached that label. If this was not something that we were born with, it is very likely that the condition was triggered by something, and it can be reverse engineered. And the same thing holds true for hypertension. But instead, today of course we get into the pill mill, we get into that merry-go-round of drug usage, treating the symptom and not removing the underlying cause, and also utilizing things that tend to have a lot of downstream side effects. Whereas something like chlorella has a clinically proven benefit on hypertension, but also improving overall cardiovascular health.

And I even mentioned improving the health of our vision. Like that's what food can do. That one trick ponies in the form of pharmaceuticals simply cannot do. Now I get chlorella and other chlorophyll rich super foods like spirulina, which is about 70% protein by weight. By the way, chlorella is about 50% protein by weight if we're talking about being able to assist in normalizing our blood glucose levels. These are combined together along with ashwagandha

for managing stress, along with wonderful coconut water and other superfood all organic in the Organifi Green Juice formula. Head over to organifi.com/model and you're going to get 20% off. They're tasty. This is the best tasting green blend in the world. This is what set Organifi apart in the first place prior to Organifi hitting the scene, I'm one of those guys that've been in this field for over 20 years. I used all these different green blends that shall remain nameless that were nasty, they weren't even just nasty, they were nasty!

And I suffered through it because I was like, health is suffering, right? You sometimes just got to, grin and bear it. But the truth is, long term, especially for everyday folks' pleasure in something that we don't have to like get a large buy-in or make people suffer through to improve their health is really the way to go. And this is why I really appreciate the folks at Organifi. Again, head over to organifi.com/model. That's O-R-G-A-N-I-F-I.com/model. You get 20% off their incredible all organic green juice formula. They have incredible red juice blend as well and so much more. You're just going to love it so much. So, head over to check them out, organifi.com/model. Now moving on in our Blood Sugar Masterclass. You're about to hear from the person who's largely considered the premier expert in blood glucose management today.

And I'm talking about Dr. Casey Means. Casey Means MD is a Stanford trained physician, chief medical officer and co-founder of the metabolic health company Levels and associate editor of the International Journal of Disease Reversal and Prevention. And in this segment, Dr Means is going to share how abnormal blood glucose is connected to the leading causes of death in the United States. All right? She's going to address the 10 leading causes of death in the United States and tell you how many deranged blood glucose is controlling or influencing. And I think it's going to blow your mind. She's also going to talk about the worst foods for healthy blood sugar based on millions of data points. And some of these foods are going to be surprising for you and also how to make those foods healthier from a blood sugar standpoint and so much more. Man, one of my favorite people, one of my favorite experts in the field today, check out this segment from the incredible Dr. Casey means.

DR. CASEY MEANS: Blood sugar is an incredible biomarker because it's a readout of so many different aspects of our health. Of course, food impacts blood sugar. When you eat a food with carbohydrates, it gets broken down, goes into the bloodstream and we're going to see that as a rise in blood sugar. But what a lot of people might not realize is that other things can cause an increase in blood sugar, like if we're stressed. Stress alone can cause cortisol to be released in the body and that cortisol goes to the liver and actually tells our blood sugar to raise. And the purpose of that is to provide energy for our body to mount a response to whatever that stress signal is. So, stress can raise our blood sugar. Exercise of course, has a profound impact on our blood sugar because muscles when we use them, that's a glucose sink, it takes glucose out of the bloodstream.

Sleep also has a profound impact on blood, blood sugar. When we don't get enough sleep, our glucose can be more erratic and can be more up and down and more spiky. Our microbiome has a profound impact on our blood sugar and people with different, patterns of microbial composition in their gut actually respond to different foods differently in terms of how much their blood sugar raises. So, it's really this incredible, readout in our bloodstream of so many different variables in our, in our diet and lifestyle. And so, big picture, what it does is show us what's kind of going on with our metabolic health. And we're hearing the term metabolic health so, so much more these days, thank goodness, because we're realizing that metabolism in our metabolic health is really one of these links and these connectors between so many of the different symptoms and diseases we're seeing today.

Blood sugar is actually related to nine of the 10 leading causes of death in America right now. If you go to the CDC website and you type in leading causes of death, you will see 10 different conditions and nine of the 10 of them are either directly caused by elevated or dysfunctional blood sugar or are worsened or accelerated by dysfunctional blood sugar. So, you're going to see things like of course Type 2 Diabetes, which clearly is linked to blood sugar, but also things like cancer and Alzheimer's dementia. Alzheimer's dementia is now being called Type 3 Diabetes 'cause it's so linked to blood sugar. You're going to see heart disease which is directly linked to blood sugar. But you're also going to see things like, respiratory infections. We know that respiratory infections, even things like influenza, the mortality and morbidity in these conditions are much worse in people with unstable blood sugar.

So, blood sugar really is something that all of us need to be aware of what's going on inside our own bodies. In terms of where our blood sugar stands, and I know you've talked about this on your show before, but right now 128 million Americans, that's almost 50% of the country have Type 2 Diabetes or pre-diabetes. So clinical dysregulation of blood sugar. If you're an American adult, you're just on a trajectory, towards, towards getting a blood sugar problem. And the vast majority of these cases are totally preventable, and they are so linked to increased morbidity and mortality from chronic disease. And, and so this is just really low hanging fruit of this biomarker that we can track and manage to set ourselves up for current wellness, current performance, but also avoidance in chronic disease and increased longevity. So Levels is a program that allows people access to this amazing little device, a biosensor called a continuous glucose monitor, which like you said, you wear on the back of your arm and it stays on the arm for two weeks and it's measuring in the background your blood sugar 24 hours a day, seven days a week, sending that information to your smartphone and letting you see in real time exactly how your food choices and your other lifestyle choices are affecting your blood sugar, which we know is so important.

And in doing this, it's really the first time ever that we've had closed loop biofeedback on what we're eating. We've got that metric ton of food per year, and we don't really know what it's doing to our body. If we go into the doctor's office and let's say our blood sugar is a little bit higher or our cholesterol's a little bit higher, they're going to say, oh, eat better, exercise more. But what does that mean? Like it really doesn't give us a lot of control or power and understanding things. And something, a stat that's really fascinated me is that 49% of Americans go on a diet each year. So, they're 49% of Americans are trying to do better with their diet. And yet as a country, we are just getting sicker. We are getting heavier; our life expectancy is going down.

We're getting more depressed in the face of rising healthcare costs. So, there is an effort outcome mismatch. And I think one of the big reasons that's the case is because we don't really know what the food we're eating is doing to our body. And unfortunately, we have to rely on generic recommendations from our doctors or we follow, a nutritional ideology and we've got of course these warring voices in the healthcare space about, or I'm sorry, in the nutrition space about what we should eat. There's the nutrition wars going on. So, it's very confusing and confusion makes people doubt their choices. And then we've got this rampant food marketing culture that can basically say anything they want on the boxes, without us really knowing what, what the truth is. And so, in the face of that ecosystem, having this kind of closed loop relationship where you can eat a specific food and know exactly how it's affecting your blood sugar, this key metabolic biomarker in 10 minutes and maybe you've been dieting for 30 years and nothing's working, and then you eat your breakfast.

Let's say you eat oatmeal with a little bit of blueberries and brown sugar and you see that your blood sugar goes up 80 points, which would be a really, really high rise. You can say immediately in one time of just checking this food with your continuous glucose monitor, oh, this food isn't working for me. This food is likely causing a big insulin surge in me. And we know that one of the many functions of insulin is that it blocks fat burning in the body. We've talked a lot about insulin, but aside from shuttling glucose into the cells and being an anabolic hormone, another thing that it does is signal to the body to not burn fat. It's a signal. Oh, we've got tons of energy around in the form of glucose, why would we tap into our fat stores? It blocks fat burning.

So, if you see that big spike with your oatmeal breakfast and you're trying to lose weight, you can immediately say, oh, this might not be the best breakfast for me for the goals that I have and to be able to cut it... And oatmeal, of course, if you go into the store, it's going to say heart healthy, a great source of whole grains. Your doctor might say that it's, I mean, really go on any website that says what's a healthy breakfast? It's going to say, oh oatmeal. But if it's causing 80-point glucose spike for you, it is not a healthy breakfast for you. And that's, that's what I learned for myself, actually. I had about, a 75-to-80-point rise from just totally plain

oatmeal. So no question, it's not a heart healthy food for me because glycemic variability, big spikes, independent risk factor for heart disease.

I'm putting my body through this rollercoaster. Not to mention after a big spike like that, usually what you have is a crash. 'cause your body's released all that insulin, that huge insulin surge, it causes you to soak up all that glucose that just spiked. And often you can have a dip after that. And that's called reactive hypoglycemia after a big spike. And that's often when people feel that post-meal crash that lethargy like an hour or two after a meal when they kind of need to take like a nap after lunch or after breakfast. That's often when you look at your data, right when you had that dip after a big spike. So, if you can figure out how to actually stabilize that spike, make it more gentle, you're not going to have that crash. You're going to feel better throughout the day. And so, I think the biggest thing is just really figuring out the personalized diet for you and being able to cut through just the super loud voices in food marketing, in the nutrition wars and figure out what's right for your individual body.

And there was this amazing study that came out about five years ago in the journal cell that was called Personalized Nutrition by prediction of glycemic responses from the Weissman and students in Israel. And what they did was they put, they took 800 non-diabetic healthy people, they put continuous glucose monitors on all of them, then they gave them standardized meals. So they all ate the exact same thing, same macronutrients, same calories, everything. And what you'd probably think would happen based on our conventional understanding of blood sugar is that everyone's blood sugar would spike the exact same amount because they're all eating the exact same food. And if you think about things like the glycemic index chart, what that sort of tells us is that, oh, each food has an inherent property, an inherent quality of how much it will raise blood sugar. But the opposite happened, people were all across the board with these similar, with these same foods.

So, let's say they had these standardized cookies, some people would have no glucose response to it, other people would go up a 100 points in their glucose and some people actually had equal and opposite reaction to two different foods. So, if you gave person A a banana and a cookie, they might spike to the banana and be flat to the cookie and person B would be the opposite. And then they looked at what actually was determining those outcomes and they came up with like over a hundred factors in the body that might impact why people respond differently to different foods. And one of the big ones is microbiome composition that we've already, touched on. So this is there, there's this personal, personalization of diet that I think can be really, really powerful and there may just be like landmines that we aren't aware of that are thwarting our goals, whatever they are, weight performance of chronic disease.

With just a quick look at your data, you can kind of figure this out. And I think bigger picture of the thing you really nailed the word, it's about empowerment. There's two different worlds

we can live in. There's a world where you live your life based on what people tell you to do and what is normal and you're kind of at the mercy of, of kind of that external input or there's a world in which you can trust your own body, your own data, your own intuition and make choices for yourself. And honestly, that's the world I want to live in. That's power. I think a lot about patients who have to go into the doctor's office and kind of wait for the doctor to tell them what's going on with their own body. Each year their doctor might say, oh, your blood sugar is two points higher than it was last year.

Oh, it's five points higher than it was last year. One day they're going to go into that doctor's office and a bomb's going to be dropped on them that you now have pre-diabetes, or you now have Type 2 Diabetes. When we have access to our own personal data day in and day out, not only can we figure out things like our diet, but we also can understand the trajectory of our health better. We own that process now. And the idea that someone could actually have that information and never go into the doctor's office and have this surprise bomb dropped on them, they go into the doctor, and they say, oh, I know what my blood sugar is and it's in a stable and healthy range, you're guaranteed to not have some bomb dropped on you. And that is so exciting to me. That really changed the relationship between patients and doctors.

And it just, it just really thrills me to think that patients could have more agency and empowerment in the face of this. Unfortunately, several industries that in some ways benefit off us not having that information. Obviously, the food industry certainly, benefits off us not really knowing what's, how the food is affecting us and then the healthcare system, benefits from us, not being able to access this data ourselves where they are in control of ordering the labs and, prescribing the medications and whatnot. So, it just really excites me to think about a population that has more information and can make these choices for themselves.

SHAWN STEVENSON: Yes. And this is a great use of technology, something that's empowering. And I love that you put emphasis when you said these words, when you were talking about the trial you ran plain oatmeal. You said, this is the response for me.

DR. CASEY MEANS: Yeah.

SHAWN STEVENSON: Which it could be different for someone else. And this is what it's all about. Personalized nutrition is the thing I've been, prior to the Model health Show being in existence when I was in my private practice, that was a thing that I was advocating. And I just thought it was obvious. But I got to be honest, in the beginning, if I was into something, that's what the patient would be into. If I'm like, vegan raw food, that's what you're going to do. Because I think that this is the greatest thing ever. If I'm keto, that's what you're going to do, because I think it's the greatest thing ever. But thankfully, I kept an open mind and open heart,

and I could see, wait a minute, this thing is working great for this person or these people over here, but it's not working for these folks over here. What is it?

And just having that inquiry and starting to open my mind and understand that what we really need is nutrition that's right for us right now in this moment. And understand that that is probably going to change. And so this is where we start to get equipped with tools like this. And that data in the study from the Weizmann Institute is so fascinating. I actually talked about it in my latest book And Eat Smarter because it is so eye-opening and also empowering for us to understand, hey, we've got all these great diet frameworks and there's a lot of infighting taking place because everybody thinks that their diet framework is the end-all be-all. And that's the problem.

We're fighting about minutiae at the top and missing on the fact that most people are consuming a sh*tload of processed foods. And that's really the issue we all need to be collectively working together on just getting folks back to eating real food and being able to pay attention to what's right for us right now. And because this is exclusive with the Model Health Show, because you are a listener of the Model Health Show, you're going to get to jump the line and to utilize Levels. And again, this is exclusive for us. Go to levels.link/model, that's L-E-V-E-L-S.L-I-N-K/model. And you get to jump the line, you get to jump the line, you get the VIP, you're rolling up to the club, come right in. You get to jump the line. And to take advantage right now, be a part of this incredible beta process. And the technology is already so wonderful.

I've gotten so much that folks can see on the video. You can see a little, I know my sleeves a little tight, [laughter], but you can see the Levels and there's a great sticker to cover it up so you could exercise, shower, all that stuff as well. And I just wanted, first of all, thank you for that and allowing us to be able to access this right now and to get this data. And so, the next thing I want to ask you about is utilizing levels and the great dataset you already have. You could see patterns, and again, this isn't about being neurotic or this is the end-all be-all answer, but you guys did get a great accumulation of information about what are some of the most problematic foods for folks as far as creating some disorientation with their blood sugar. So, let's talk about what some of those foods were. I know that you mentioned oatmeal, so was that one of those, we'll just give a, if you can, the maybe the top five foods that maybe even was surprising to be problematic for most folks.

DR. CASEY MEANS: Yeah, absolutely. One of the things that we see certainly across the board is that processed foods cause a large spike, these ultra-processed foods based and refined grains and flour and whatnot and sugars and those are kind of, we'd expect that. But we actually also see that there's a lot of foods that we typically consider to be healthy, which actually cause a really large glucose spike. Some of the ones in our data set that have been really high spikers are things like grapes, actually, sweet potatoes, oatmeal, corn, funnily

enough, acai bowls are one that get logged a lot, that have a really big spikes. These are foods that have lots of nutrients in them. Of course, they're beautiful plant foods. But when eaten in isolation tend to cause a really big glucose spike.

That leads us to something else that we've really seen in the data set, that when we balance meals and balance foods that have high carbohydrates, we actually see a much lower glucose response. So often adding fat, fiber and protein to a carbohydrate actually causes a more gentle rise in glucose. It slows down digestion, fiber actually may decrease the amount of total glucose you even absorb from the food. Protein also slows digestion. And so balancing foods and meals with other macronutrients and not eating naked carbohydrates is something that's really helpful for a lot of people. The difference between an apple alone and an apple with a little bit of almond butter and maybe some chia seeds sprinkled on top is actually can be a really big difference.

And that's why I see, think we see something like grapes being such a high spiker grapes are something you often just sort of eat by the handful on their own. You're not really pairing it with a lot of other protein sources usually or fat or fiber. And so, we just see these really, really big rises. But another thing that we see that's really kind of interesting is how you can take kind of like a food category and see that there's quite a big spectrum in responses. So, for instance, like sushi, if people who just log sushi in the levels community tend to have quite a large glucose spike, like well over 30 milligram per deciliter to rise after sushi. But people who log sashimi which is of course this fish without the rice. Another thing you could order at a Japanese restaurant have a very low glucose response, less than 10 milligrams to deciliter. So maybe that kind of gives us the information of like, "I'll order more shashimi and less of the rolls with the rice."

And then there's this whole new category of sushi that some people are doing, which is like cauliflower rice sushi, which actually tastes totally delicious, and I make it at home and I love it, which has virtually no glucose response, even though you're still getting this, these beautiful sushi rolls. And so it helps you kind of think through what am I going to order at a restaurant if my goal is to keep my glucose more stable, more flat? Similar with, one that's really fascinated me is nutrition bars. You go into Whole Foods or Arowana or whatever, and there's like a hundred different bars you can get, like Luna bars, Cliff bars, Bulletproof bars, Quest bars, there's so many. How do you choose? You're just like looking which box is prettiest, which has the best claims on it, whatever.

Well, we can see in our data set just like a total spectrum from bars that have virtually no glucose response to bars that have really high glucose response. In fact, I won't name names right now, but some of the healthy, nutrition bars that are in sort of like a nice brown paper wrapper that look like you should take it camping or something like that, have a much higher

glucose response than a Snickers bar. And then there's other bars like the Bulletproof bar, Quest bar, perfect keto bars that have virtually no glucose response. So, what I get so excited about is thinking that the future of nutrition is going to be people being able to make these choices in the grocery store based on data, not based on food marketing, not being at the whim of these industries who want us to buy this food, but actually making a decision based on data.

Not only their own data, like the biofeedback loop they've had by testing something and seeing what worked for them, but on population data. What was the response to this over 10,000 people, over a million people, we have 51 million glucose data points in our data sets. 1.5 million food logs that have been logged. The power of people being able to tap into what's happening on a population level these foods. I think that's going to be the future of nutrition. I think in five years it's going to seem very like quaint and outdated to choose your foods not based on objective biometric data that has been tested both in you and in a large population. You can imagine, right now we go onto a, we Google some recipe we want to cook for dinner and a million recipes pop up. And we usually pick by like, how many stars does the reviews have? And does this have any ingredients I don't want to eat?

But we're just a couple years probably away, maybe less from the time when there's actually going to be another section there that says, this is how the population responded to it in terms of glucose rise. And then you can test it for yourself and find your own data about that. And that to me is power. That to me, puts the hands in the population, puts the power in the hands of the population and totally out of the power of the food industry. And I think it's going to open up radical transparency that's going to be demanded by people for both the healthcare and the food system saying, don't try and just sell this to me, like with marketing claims, because essentially marketing's going to become obsolete because the marketing's going to come from within from how we respond to it.

And so that really excites me. And I think when I look at, like I scan the data set of like what's happening with just nutrition bars or brands of non-dairy milk, you see a big spectrum of what is causing a glucose spike and what's not. And that is already driving a lot of the decisions of people in our community, which I think is exciting. And the last one I'll mention is that breakfast foods have been a massive thing. I think I've seen interesting data in our data set, which is that if you look at our best scoring foods, so when I say best scoring foods, I mean foods that had the most minor glucose response, very flat and stable response, versus the worst scoring foods which have big spikes in dips across breakfast. There are like clear breakfasts that are not working for people's blood sugar and clear ones that are.

When you look at what's in the worst, the big spiking category, it is waffles, pancakes, bagels, donuts, pastries. It's all these white beige, flour rich, sugar rich foods, which if you walk into a

coffee shop, like that's what you're going to see behind the counter. We have normalized that these are breakfast suits. Cereal is another big one. Cheerios actually specifically, is one that has a huge glucose response. For me, those are just kind of off the table now. When you look at the best scoring foods, it's things like eggs and avocado, eggs and greens. Actually, the Fab 4 smoothie, which is a smoothie that was popularized by Kelly LeVeque, amazing nutritionist, which is basically a smoothie that's a mix of greens, proteins, fat, fiber, minimal sugar, very good score.

Frittata has a minimal score; I'm thinking about other things in the dataset. Chia seed pudding, very minimal glucose response. So it's not like it's just animal rich foods. It's also some of these plant-based foods like a green smoothie, a specific type of green smoothie that's well-balanced and chia pudding. So I look at all this and I'm like, great, if I'm trying to lose weight, if I'm trying to keep my blood sugar down, if I'm trying to improve my risk of chronic disease, I'm not eating these things even though they're covering the grocery store, even though a lot of the foods in these foods are subsidized by our government. So, it's normalized that they're okay not eating them, but I am going to eat eggs and avocado, eggs and greens, chia pudding, fab 4 smoothie, frittata, et cetera. And that's kind of some of the stuff we're learning about food in the dataset. I could go on and on, but it's just, it's a whole new world of how we're going to judge food and nutrition.

SHAWN STEVENSON: All right. I hope that you're enjoying this Blood Sugar Masterclass. This is something for us to truly imbibe to share with the people that we care about. Learning about this topic is incredibly important today. And that was Dr. Casey Means again, Stanford trained physician and associate editor of the International Journal of Disease Reversal and Prevention. And as mentioned chief medical officer and co-founder of the metabolic health company Levels. And if you're not taking advantage of Levels, you need to like ASAP, go to levels.link/model, that's L-E-V-E-L-S.link/model and get hooked up.

Now, next up in our Blood Sugar Masterclass, we have multi-time New York Times bestselling author, triple board-certified nutrition expert and Fitness Hall of Famer, the one and only JJ Virgin. Now in this clip, JJ is going to be sharing what led to the great snacking era in the 1980s and '90s. This was the golden age of snacking that's carried over, it's changed the culture that really hit his stride. And she's also going to be talking about the number one macronutrient for healthy blood sugar management that is often overlooked. Check out the segment from the incredible JJ Virgin.

JJ VIRGIN: And I still remember when the snacking thing happened. I remember this was so, like remember when the whole fat-free craze happened?

SHAWN STEVENSON: Yeah.

JJ VIRGIN: 'Cause I was teaching aerobics in LA at the time when the whole fat-free craze happened, and we were eating carbs all day long 'cause we were starving. And so you had to graze and snack and everyone was teaching you to graze and you were grazing on fat-free things and it was ridiculous. And I was so hypoglycemic at the time that I remember I would get shaky. I mean it was, I was working out hours each day and I was just a metabolic train wreck. I mean one of the single easiest things like when you look at it, if you first start and you eat protein and you make 30 grams your minimum amount you're going to get at that meal, like always hit 30 grams, that's your minimum. And then you make sure you get some non-starchy vegetables in there and you start with those two with great blood sugar balance. You're going to get healthy fats in the protein. Then you can look at adding in healthy fats, maybe some slow low carbs. But if you eat that way and then you drink water in between or ice cream tea, you're actually not hungry. If you're hungry, you're probably hungry from this processed crap that they built all this trigger stuff into like, I'm hooked on something called Catalina Crunch. Have you seen this stuff?

SHAWN STEVENSON: I can't say that I have, I know where Catalina Island is.

JJ VIRGIN: Don't get it. Okay, so don't get this because like I love cereal, I love cereal and so it's this keto cereal. I've no business eating this, but it's like I'll make a smoothie and then I'll put a little bit on top and it's got protein but it's a total like they have so engineered this stuff so that you want more, and you want more and you want, it's a ridiculous stuff. I'm like, I know what I'm doing, just walk away from this stuff. But that's what all these things are. They'll design these things. They look like they've got a health halo because they say Keto or gluten free and they're a cupcake and then they're so delicious that you overeat. If you just go back to again, no one's picking out on salmon and Brussels sprouts, right? And then you're actually full, imagine that.

SHAWN STEVENSON: Imagine that.

JJ VIRGIN: And then you could have breakfast two hours after you wake up, get in at least 30 grams of protein. If you're 120-pound woman, like you're going to get in 90 to 120 grams depending on your goals. And then you eat lunch and then you eat dinner simple, and you stop dinner. If you're going to bed at 10, have dinner and be done six, seven at the latest. Not hard. And that means you shut down after dinner any little, you have a bite of chocolate at nine that does that counts. It all counts.

SHAWN STEVENSON: But the key here is for us to even feel satiated at that point where we can just wind down in the evening The keyword is the satiation being satisfied, not having a craving or a draw towards getting that glass of wine or getting a snack or whatever the case

might be. So, it's what you're doing during the day is going to determine how your evening's going to go.

JJ VIRGIN: Yeah. It's those meals you eat that it's like, did you hit a hormonal winner or not? We have an inner guidance system, this intuitive GPS, it's completely screwed if you're eating processed foods. Okay, case in point, Catalina Crunch, I would eat the whole thing. Like I'd eat an entire bag full of Catalina Crunch because it's so delicious, right? I wouldn't do that with, again, chicken and broccoli. I'd eat what I needed, and I'd be done. But there's no triggering in there. So, we have to really, the only way for us to really know what we need is we have to figure out our hidden food intolerances because if we've got things sneaking in that our body's intolerant to will crave it and that could, or we've got to make sure we're the sugar sneaking in. Cuz if you're not paying attention, it's in the stupidest things.

Like you go out to a restaurant, and they gave you this olive oil blend and then they put all this sugar in the dressing and then they put the candied walnuts and the Craisins and all that stuff on the salad and you just had a sundae with some lettuce on it. Right? And you can't figure out why you want more. So, we have to be really careful about how we listen to our intuitive guidance system. It can only help us when we've kind of gotten clean, right? Otherwise, we'll be at night going, oh, my guidance system says I need some wine and chocolate.

SHAWN STEVENSON: That's the Waze. You got that internal Waze app. Waze right to the drinky. So, it sounds like we've got two major GPS coordinates that are kind of messed up. We've been so focused. We put in that in destination in the GPS for weight loss when we need to set that in destination to muscle gain. And then the same thing holds true with nutrition where we've had that GPS set to fats and or carbohydrates and battling back and forth in camps, these infighting with these two different camps when it should be directed towards protein.

JJ VIRGIN: Which is so odd, isn't it? You look at those two things and they're so obvious. I mean we all know that if you diet and lose weight and gain it back and lose weight and gain it back that you now have really messed yourself up because you've shifted your body composition and you've now a higher body fat. And then on the other side, having been in the diet world since I was 20, it's so weird to look at the fact that we for the last 30, 40 years have been manipulating carbs and fat and carbs and fat and carbs and fat. And then we'll also do percentages of it should be 30, 40, 30. No, it should not be a percentage. There's an absolute on protein. There's no percentage there. And I also don't believe in a percentage on non-starchy vegetables. I think that's a non-negotiable of like, you need at least five. And I'm not afraid of vegetables. I know that there's like, there's, it's so funny when the whole plant controversy came out, I go, now we're afraid of vegetables too. Great. Do not fear the broccoli. They're different.

SHAWN STEVENSON: Do not fear the broccoli.

JJ VIRGIN: I cannot fear.

SHAWN STEVENSON: That's a tweetable. That's a tweetable. Well, I want to ask you about this as well because even have this insight about the order in which we're eating our foods can make a difference with our metabolic health. Let's talk about that.

JJ VIRGIN: Yeah. And that's, well this is what's so great about wearing these continuous glucose monitors, which by the way, I got totally attacked on social media for wearing a continuous glucose monitor. When you really look at what's going on here, our health crisis is a health crisis of blood sugar and insulin sensitivity. It is a crisis. If we can have people see in real time what's going on, it will change everything. Right? So if you're wearing a CGM and you can see in real time, boy, if I start the meal and I sit down at the table and they bring the bread basket over and I have the bread and the olive oil and I just have that for about and then maybe a glass of wine and that's the first 30 minutes and then I get my salad and then I get my entrée. Well, you've already hijacked your blood sugar. But if you instead of doing that, sat down and you could either have vegetables or you can have protein, I'd argue that I'd really like to have protein first. But sometimes at a restaurant you can't say, bring me my chicken, bring me my, if you're in Italy, it works out great, but otherwise it can be challenging.

When you eat the protein first, remember this is way more thermic. It's way more satiating. And again, we know that we eat something, and we don't immediately feel satiated. It takes a little time. So now you've got a little time. If you make it your process to go protein, non-starchy vegetables, that should take you 'cause we're actually going to chew instead of just guzzle it down. I'll tell you Shawn, being a trainer for years and having to run from client to client to client, I was the best, fast eater on the planet. Like I could have entered contests of how fast I could eat. I, this has been such a thing to control myself, to not eat too fast and to be the last one to finish, I still struggle. But if you can do that, you'll have so much better blood sugar control and satiety that you may not even eat the rest of the plate. Right?

SHAWN STEVENSON: Yeah.

JJ VIRGIN: So, you don't need it.

SHAWN STEVENSON: All right. Next up in our Blood Sugar Masterclass. You know him, you love him. He's the author of the USA Today national bestselling book, Eat Smarter, the International Bestselling Book, sleep Smarter, the host of the Model Health Show, featured as the number one health and fitness podcast in the United States with millions of listener downloads every

single month. I'm talking about yours truly, Shawn Stevenson. All right. Now in this segment from an episode that we did that was really a masterclass on sugar itself and really unpacking the industry of sugar, the history of sugar, and also some of the things that we can do to help us to reverse the curse when it comes to sugar.

Now in this segment, I'm going to be sharing the number one thing to avoid to improve your blood sugar. Now this is the number one thing, again, the most detrimental thing across the board for deranging your blood sugar. Plus, you're going to learn the remarkable way that muscle impacts your blood glucose. Check out this next segment in our Blood Sugar Masterclass. The sugar that we eat, I don't think folks realize just how quickly that sugar ends up driving so fast and furiously into ourselves. It's just like Vin Diesel-ing into ourselves so quickly, but nothing happens as fast as sugar that's coming along in that liquid form. A study that was published in the Journal of Nutritional Biochemistry asserted that our fastest method of delivering sugar to ourselves is through the consumption of liquid sugar.

Again, this is well established and it's just, it's a logical thing. The researchers asserted that the consumption of highly concentrated liquid fructose leads to the development of hypothalamic leptin resistance and the development of excess visceral fat. None of these are good. First of visceral fat. This is more a cognitive visceral association because it's something we can see physically. The visceral fat, aka omentum fat, aka belly fat. This is that deep abdominal fat. We're seeing firsthand. These researchers are indicating that the consumption of concentrated liquid fructose is directly causing this issue, like it's one of the primary drivers of the belly fat or visceral fat epidemic that we're experiencing as a society. But for this, for our intents and purposes right here of breaking up with sugar is the hypothalamic leptin resistance. What the heck does that mean? The hypothalamus is well established to be the master gland in the human body, a master regulator of your entire endocrine system, aka your hormone system.

And it's really a tie-in it's far more than just a endocrine gland. It's a tie-in for your endocrine system and your nervous system. So, all the data from your nervous system, your brain, and all of the offshoots of your entire nervous system throughout your body, that data integrating with your hormone system, your system of hormones that are getting produced from your thyroid, from your adrenal glands, that integration point is taking place largely in the hypothalamus. So again, it's a master regulator of your entire endocrine system. It's really a primary point of emphasis if we're talking about your metabolic rate, because your hypothalamus is sort of like the thermostat that your body is set at for its rate of calorie burn and calorie absorption in constant communication with your gut to even indicate if your downstream supplies, if there's information coming up that your supplies are low, your hypothalamus can send data to your gastrointestinal tract, to your gut to actually increase the absorption of calories from your food.

Or it can tell it, turn it down some. It's so remarkable when we start to understand this, but hypothalamic leptin resistance. So, leptin is a primary satiety hormone when leptin is being produced. It's telling your body that I'm satisfied I'm not hungry. In this battle, this potential breakup battle. Alright, some sugar baby daddy drama, baby mama drama sugar baby. I'm thinking, sorry, I'm thinking about the candy all right, sugar daddies. All right. It's the little chewy little candies. Anyways, but that sugar baby daddy drama, 'cause there's also sugar daddies, all right? They had the sugar babies; it was the little bite size and the sugar daddies with like on the stick. All right? So, when this is taking place, that struggle in breaking up has a lot to do with the satiety hormones where the cravings start, where the inability to not be drawn towards it has to do with these satiety hormones significantly.

And when the brain, this is a primary site for leptins communication to tell your brain and physiology because your hypothalamus is informing everybody that I'm good, I'm peaceful, I'm satisfied. And if there's leptin resistance for your hypothalamus that your body's producing the leptin, but it's not... The message isn't getting received, guess what's going to happen? It's going to be an a tremendous struggle to be able to manage one's satiety and manage one's cravings. What's driving this breakdown? Liquid sugar. Liquid fructose, primarily as is indicated in the data. And it just makes sense because it's hitting your system so fast. So, here's what we do. Number one, we look at an example. Number two, we take the on-ramp of addressing this. Let's take an example of a 20-ounce bottle of Coca-Cola supplying 65 grams of sugar. That's 16 teaspoons. That's a normal Coca-Cola bottle in our society.

16 teaspoons. Let's take your little teaspoon scoop. Let's go scoop it. One, two, three, four, five, six, seven, eight, nine, dix, all right throwing a little foreign language there. 11, 12, 13, 14, 15, 16 teaspoons. That's a boatload of sugar. All right? And has become a common part of our culture, but for me, I wasn't the biggest soda drinker. I love my juices. All right? Hawaiian Punch and even a hundred... What we consider to be a 100% juice, orange juice, that was my jam. 100% pure orange juice is actually not far behind that Coca-Cola in its sugar content, it has in that same 20-ounce amount, that will be 56 grams of sugar for a whopping 14 teaspoons. Now we can say it's coming from a more natural source. Cool. We're talking about sugar here, because that amount of sugar coming in is going to hyper stimulate insulin, it's going to damage leptin and literally derange the communication between your brain and your body.

It's just not appropriate, right? For most folks, sure. If you have an orange juice every now and then, sure. Okay, but I was drinking orange juice on the daily if we had it, and just, I have no idea what it's doing to my biology. So, this is... These are the stats. So, we're looking at what the problem is on ramp step for how do we break up with sugar. Step number one let's ease back on the liquid sugar. Step one, you don't have to stop with cookies, ice cream, all the other stuff. Okay, just let's put the sodas to the side it's just not worth it. All right? And we can have

this conversation about, well then what about artificially sweetened sodas? That behavior, and I talked about this in Eat Smarter as well, we have some peer-reviewed evidence linking artificial sweeteners to increased rates of dementia, for example, this isn't without a cost.

And for some folks they've used artificial sweeteners to great reward and that's all good. But we cannot be ignorant of what the scientific evidence states because our biology is wired a certain way. And we literally we're creating a chemical structure that has never been invented before or used before in human history throughout our evolution. And trying to trick the body into believing that this sweet thing, that there's going to be calories coming along with it, but it's just like, nope, there's no calories actually. Or there's far less calories than what this sweetness is indicating. Your body... We're acting like our body is stupid. We're acting like our brains are stupid. We can just trick that silly brain of ours. Scientists at the Washington University School of Medicine constructed a trial that involved 17 obese test subjects who did not regularly consume artificial sweeteners. And they found that the artificial sweetener sucralose that was used in this particular clinical trial, actually elevated their blood sugar levels by 14% and increased their insulin levels by 20% on average.

This is a non-caloric artificial sweetener that's used to trick the system. Why is our blood sugar going up? Why is insulin going up? Artificial sweeteners pretend to be home alone, in a sense, it's like a Home Alone scenario. You got the people creeping in, but really, you're about to get hit with some booby traps. All right? The sticky bandits, right? The wet bandits are... That's what we're really getting with this liquid. We got the sticky syrup, and we got the liquid substance. So that's truly, like... By the way, this is a Home Alone reference. Hopefully you've seen part one and part two. It's if you're a person, all right? But please understand that this is not coming without a cost. Let's just step away from that and sure, we can substitute in, maybe try, you know, do a little swappy swap. You know, maybe you do a kombucha, which you got to be careful with the sugar there too, let's be honest.

But the sugar is far less. Find you a nice kombucha or kefir as a bridge. Some folks say they do the sparkling water, it's all good. I don't necessarily think that that's for most people. They're not just going to be like going from a nice little crisp sparkling water, a LaCroix and they're just coming from Mountain Dew and just talking about, oh yeah, this is great. This is a great substitute. Let's not for not... It's not for everybody. All right? So, but consciously stepping away from the liquid sugar delivery system. And also, same thing with juices. We got to be mindful, even if we're making fresh pressed juice, what is the sugar? Especially if we're trying to get healthy and we're wondering what's stopping us? Let me be clear, this doesn't mean that juicing, especially even adding in a little bit of fruit with our juicing cannot make somebody dramatically healthier.

Let's be clear. But if we've been doing something for a while in our body, we're not getting the results that we've really been looking for, we want to pay attention to the sugar because we're going to allow for our hypothalamus to literally heal that connection between our brain and the rest of our physiology. Get leptin sensitivity high, get insulin sensitivity high, and start to heal this situation. Another remarkable way to separate from sugar and where your friends are like, girl, you don't need him. Another remarkable way to go about this is to focus on building muscle. The thing about our muscle tissue that's so remarkable is we don't really even need insulin involved in the capacity that's happening with the rest of our bodies. Muscle can uptake and utilize sugar and help to balance out blood sugar in a way that we are just now starting to acknowledge and understand.

It is truly remarkable. And as we're focusing on building muscle, it's increasing our overall insulin sensitivity systemically. And so once we can shift over a part of that healing process and that, you know, for some folks when they are breaking up, they're focused, they're changing their life, they focus on getting fit. All right? You know, my deepest condolences to the person who lost me, because I'm about to take it to another level. All right, so focusing, making this hand in hand with backing off on the liquid sugar delivery and also focusing on building some muscle. So this is going to be through primarily resistance training, right? So doing the squats, doing the pushes and the pulls and the lunges, all of the basics and there's thousands of ways to do this stuff and combine them in different ways. But the bottom line is we're making a priority. At least just twice a week, two to three times a week doing some resistance training, adding some more muscle to our frame can dramatically help to reverse the sugar curse.

All right now to close things out in our Blood Sugar Masterclass, we're really looking at and zeroing in on solutions. Now, you just heard me talk about how muscle is critical and adding some muscle to your frame is critical for glucose disposal. We don't even need to incite insulin in order for our bodies to clear out our blood sugar if we have ample amounts of muscle on our frame. Muscle really works as a vacuum or factory for glucose storage, and it's put into a safe place that can actually have us looking pretty good. Alright? It's a really special thing and we get to make it. That's the cool thing about it. It's not that it's easy, no one said it was easy, but we get to build muscle. And on top of that, in this next segment, again, to close things out, we're going to circle back to the beginning biochemist Jessie Inchauspé, the glucose goddess herself to share some powerful, simple science backed tactics to improve your blood glucose levels. Starting now, check out this closing segment from the incredible Jessie Inchauspé.

JESSIE INCHAUSPÉ: So, the science is really interesting. Vinegar, it turns out if you have a tablespoon of it in some water before a meal, you can reduce the glucose spike of that meal by up to 30%. And the insulin release by up to 20%, you can reduce it without changing what you're eating afterwards, just by harnessing the power of this molecule called acetic acid, which is in vinegar, that has a powerful effect on your glucose levels. And so in week two, I give

people lots of different ways to try out this hack for themselves. It doesn't have to be just vinegar and water. Most people find that not very appealing, I love it now, but to each their own. And you can have it as tea, you can make it on mocktails, you can use it as a dressing on your food. And just by adding this very small little ingredient, you can have a powerful effect on your health. And interestingly, vinegar has been used for centuries in countries like in Iran, where they just know it's a healthy thing to add. In the 18th century, vinegar tea was prescribed to people with Type 1 Diabetes.

SHAWN STEVENSON: Mm. Wow.

JESSIE INCHAUSPÉ: So culturally we've known these things. For example, the breakfast, we've known that breakfast should not be dessert. Like we've known breakfast should be a regular meal, but now we've lost touch with a lot of this stuff. And now because we have the science to show us how it actually works in our body, we can decide to bring those things back and they're really, really powerful.

SHAWN STEVENSON: Now when you say acetic acid immediately makes me think about apple cider vinegar. So, is that one of the vinegar choices?

JESSIE INCHAUSPÉ: So, any type of vinegar works, any type white wine vinegar, red vinegar, balsamic, rice vinegar, cherry vinegar, whatever. And apple cider vinegar. Apple cider vinegar or ACV is the most popular one. But it, they all work the same. For a lot of people ACV is just more palatable. They like to taste more. But you can use any vinegar you want except avoid the very syrupy balsamic glaze, which is really not vinegar anymore. It's more like sugar with a bit of vinegar in it. So as long as you're not using that, you can use whatever you want.

SHAWN STEVENSON: We already talked a little bit about the savory breakfast, the vinegar hack. Can we talk a little bit about the other two and the next one being veggies first?

JESSIE INCHAUSPÉ: Absolutely. So in week three of this method, we start having a veggie starter at the beginning of one of our meals. So most people do it before lunch or dinner, some people before breakfast, although in the morning have a hard time with vegetables. So why do we do this? Why do we add this plate of vegetables to the beginning of our meals? Well, because vegetables contain a magical ingredient called... Shawn what's it called?

SHAWN STEVENSON: It's a F word, isn't it?

JESSIE INCHAUSPÉ: Yes. It's called fiber. So fiber is really amazing. And when you have fiber at the beginning of the meal, fiber has time to go to your upper intestine and deploy itself onto the walls of that intestine, forming a protective mesh. So the intestinal wall becomes less

porous. Okay? And as a result, any glucose molecules coming down after the meal will make their way more slowly into the bloodstream. So reducing the spike they create. And very importantly in this four-week method that I designed, you don't have to cut out any foods. Nothing is off limits. You don't have to stop eating carbs. We're just adding these four hacks in, and the rest of the time we do whatever we want, and we still get fabulous results. And I think that's one of the reasons this has been so popular, is because nowhere will I tell you, never eat chocolate cake again. It's like, no, no, no, eat whatever you want, but add these hacks like gentle giants in your life so they protect you and you can still eat what you love, but have some benefits on your health too.

SHAWN STEVENSON: Immediately I'm thinking just logically with fiber and how fiber in nature and the common foods that we have, fiber's going to tend to come along with foods that are going to be higher in carbohydrates and or naturally occurring sugars, isn't that interesting how those come packaged together to try...

JESSIE INCHAUSPÉ: But in processed foods.

SHAWN STEVENSON: Yeah that's...

JESSIE INCHAUSPÉ: All the fiber is gone.

SHAWN STEVENSON: Yeah, oh it's making sense. It's making sense. It's devoid of that.

JESSIE INCHAUSPÉ: Protective substance. Yep, exactly.

SHAWN STEVENSON: So interesting. All right, so what does a veggie starter look like if we're going out, let's just say you didn't have to run to the airport after this, and we're going out and we're having lunch. All right. What does a veggie starter look like?

JESSIE INCHAUSPÉ: Well, at the restaurant you can order any side you want. You know, a lot of restaurants have like a, you can order like a side of spinach or a side of beans, or a side of roasted broccoli or whatever.

SHAWN STEVENSON: Asparagus.

JESSIE INCHAUSPÉ: Asparagus, yes, it's asparagus season. Any of these vegetables, if you have at the beginning of your meal, that counts as your veggie starter. And I also teach people like, okay, if you're not at home and you're not cooking these easy recipes, how to do this hack while you're out and about. Of course, it's really important. So, I would say my favorite veggie starter if I were at a restaurant would probably be like roasted something if they had like some roasted

broccoli, roasted brussels sprouts. I like that a lot. But you can just have a side salad. And if you want to do two hacks in one, you put some vinegar on that. Therefore, you have the veggie starter hack plus the vinegar hack.

SHAWN STEVENSON: So, the final one of these really important kind of glucose management hacks, and this one just makes so much sense and it's growing in popularity now. But this is like you're putting the icing on the metaphoric cake with this one, which is to move after eating. Talk about why that's important.

JESSIE INCHAUSPÉ: So, your muscles need energy when they're contracting, and the more they're contracting, the more they're going to need energy. And the first place they look for that energy is in free-flowing glucose in your body. And so in this hack, we just use that to our advantage. The concept is, after one of your meals during the day, use your muscles for 10 minutes. Now this can be as easy as walking for 10 minutes, as easy as the now famous calf pushup. You know this guy, the soleus muscle on your calf is really good at soaking up glucose, try it, Shawn. Go like this.

SHAWN STEVENSON: So just...

JESSIE INCHAUSPÉ: There you go. So, you do calf push up.

SHAWN STEVENSON: Sitting in the chair we just... If you're just... If you're listening to the audio version, even sitting in a chair just doing some calf raises.

JESSIE INCHAUSPÉ: And doing calf raises. Exactly.

SHAWN STEVENSON: Toes on the ground.

JESSIE INCHAUSPÉ: And so, this activates your soleus muscle in your calf.

SHAWN STEVENSON: Get those calves mooing.

JESSIE INCHAUSPÉ: Yeah exactly. So it can be that. It can be cleaning your apartment, walking your dog, doing a dance video, ice skating like, I don't know, you can go to the gym, whatever you want. If you do this, your muscles will soak up some of the glucose from the meal you just had. So it will reduce the spike of that meal without you needing to change. Again, very important, you don't need to change what you're eating, you just add these and you see a big impact on your energy levels, your cravings, inflammation, etcetera.

SHAWN STEVENSON: Thank you so very much for tuning into this episode. I hope you got a lot of value out of this. It is a lot that is invested in putting together these masterclasses and hearing from all these wonderful guests. So, I really do hope that this added value to your day. And also please, if you feel compelled to share this out with the people that you care about, because we can't do this stuff by ourselves. We've got to get this information into the hands of our friends and our families and our communities to shift the balance of power, to put the power back into the hands of citizens, to know how remarkable they are, to know that they have real science backed tools that they can use to take control of their health. We got some epic masterclasses and world-class guests coming your way very, very soon. So, make sure to stay tuned. Take care, have an amazing day and I'll talk with you soon.

And for more after the show, make sure to head over to themodelhealthshow.com. That's where you can find all of the show notes. You can find transcriptions, videos for each episode. And if you got a comment, you can leave me a comment there as well. And please make sure to head over to iTunes and leave us a rating to let everybody know that the show is awesome. And I appreciate that so much and take care, I promise, to keep giving you more powerful, empowering, great content to help you transform your life. Thanks for tuning in.