THE MODEL HEALTH SHOW

EPISODE 548

Metabolic Flexibility & The Truth About Intuitive Fasting

With Guest Dr. Casey Means

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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 in with me today. On this episode, we're going to be talking about one of the most important and powerful components of our metabolic health. We're going to be doing a master class on blood sugar, and specifically glycemic variability, how this impacts our body weight, how this impacts our insulin sensitivity, our risk for heart disease, our risk for infectious diseases. This is one of the most powerful episodes that we've done to date. It's really, really going to knock your socks off. Now, this is all part of one of the most empowering facets of human health moving forward, and something for you to take with you everywhere that you go, from here on out. And this is the understanding that each and every person on earth right now, and who's ever existed prior to this moment, and who is ever going to come later on. Every single human being has a unique metabolic fingerprint that is unlike any person that is ever lived before us or who will come after.

No person on earth right now, even identical twins, do not have the same metabolic fingerprint. And there are many different factors that make up our metabolic uniqueness, one of those being our microbiome, our microbial fingerprint. The cascade of microbes that we have is completely unique to us. Now, being within the same household as somebody, you are definitely going to have a more similar microbiome. And there's even new data indicating how our microbial health influences our relationships with other people, namely in our intimate relationships. And so, our microbial health is affecting so much about us, and a big part of that is because every single one of our bacteria that we're carrying, the trillions and trillions upon trillions of bacteria that we have in and on our bodies, each bacteria has its own genes. That's right. Every single one of the trillions of bacteria cells that we have in our bodies has their own genes. And so, if we go gene for gene, over 99% of the genes that we carry within our own human entity are microbial genes, all right? So, they're definitely having influence on what's happening with our bodies, all the way down to the genetic code. And the spectrum of bacteria that we carry as an individual is going to be unique to us. There's going to be a ratio of different classes of bacteria. For example, two of the classes that are kind of the most popular are Firmicutes and Bacteroidetes.

Firmicutes tend to be more associated with weight gain, with insulin resistance, whereas the Bacteroidetes are more associated with insulin sensitivity and leanness. Now, this isn't a black or white thing, but this is what we've seen in the data, that certain bacteria correlate with certain ranges of body composition and overall metabolic health. And so again, there's paper after paper, reference after reference, indicating just how powerful our microbes are in determining the out picturing of our health overall, whether it's our metabolic health and our

body composition or even our brain health. And so having a healthy ratio of beneficial, friendly flora, and not getting overrun by pathogenic or opportunistic bacteria, is one of the key ingredients in having a healthy metabolism. So dysbiosis is one of the things that has skyrocketed in recent years where opportunistic bacteria are starting to really dominate and control our microbiome. Now, for myself, personally, of course, the number one thing is avoiding things that damage your microbiome, that damage your friendly flora. This can range from haphazard use of antibiotics. This could be from the consumption of herbicides and pesticides or rodenticides that all are now scientifically documented to be detrimental to our healthy micro. Specifically, one of the most popular pesticides in recent years is chlorpyrifos.

Now we have peer-reviewed evidence that chlorpyrifos has been found to cause disruption in the expression of your microbial genes, all right? Not just killing or damaging your microbiome but disrupting and creating abnormalities with gene expression of your microbes. Not that good. That's not good. And again, this stuff has been newly invented. It's a brand-new chemical soup. Cauldron, bubble, double, double, cauldron, bubble trouble. It's new stuff. We don't even know the long-term ramifications, and we're just getting this stuff sprayed on our food as if it's all good. And then we have to try to prove that it's harmful instead of the manufacturer being forced to prove that it is actually healthy, or at least inert. And so, again, our system right now is a little bit twisted, but, again, avoiding things like that, avoiding other common influences that can disrupt your microbial health and cause dysbiosis. Even over-consumption of things like chlorine. And I know you're not like, "Well, I'm... Let me get a sip of that Clorox. Let me get a sip of that bleach I heard is good for killing viruses." I know you're not that person. Well, we've got a pretty ample amount, if we go and look at how it starts to compile over the days, the weeks, the months, the years, coming through our municipal water supply. You're consuming chlorine.

So, these are all indicated. The consumption of hyper-palatable, ultra-processed foods feeds pathogenic bacteria. So, avoiding those things. But also, one of the things that I love and I do on a regular basis to support a healthy microbiome cascade is, I drink pu'er tea from Pique Teas. A recent study published in the peer-reviewed journal, Nature Communications, uncovered that a unique compound called theabrownin found in this traditional fermented tea, pu'er, has some remarkable effects on our microbiome. The researchers found that theabrownin is able to positively alter our gut microbiota that directly reduces excessive liver fat. Reduces lipogenesis of the liver. You're going to understand today in this interview how remarkable this is, all right? Because we're going to be talking about the liver in relationship to fat creation and blood sugar and more, so keep an ear out for that. But this is one of those things that's found to have a positive influence on the microbiota that control these things. Another study published in the Journal of Agriculture and Food Chemistry found that pu'er may be able to reverse gut dysbiosis, because it's been found to dramatically reduce ratios of potentially harmful bacteria and increase ratios of beneficial bacteria.

But the quality matters a lot. Regardless of the tea type that you might be drinking, some of the commonly found things in conventional teas, even if they're organic: Microplastics, heavy metals, pesticides. Even if it's organic, just the cross-pollination. Toxic molds. Most companies are not testing for these things. But I drink the pu'er from Pique Tea because they do a triple toxin screening for the highest levels of purity. And it's wild harvested, so that antioxidant concentration is even higher, more robust. One of my favorite things. Head over there, check 'em out. You get a special 10% discount. It's exclusive with the Model Health Show. Go to piquetea.com/model. That's P-I-Q-U-E-T-E-A.com/model. And use the code model at check out, and you're going to get 10% off their incredible pu'er, and also their amazing... Their matcha? Off the charts. Nothing else could even touch it. And their ginger tea is one of my favorites as well. So many wonderful teas, all harvested the right way, triple toxin screened, just amazing. Head over there. Check them out. Piquetea.com/model. Now let's get to the Apple Podcast Review of the Week.

ITUNES REVIEW: Another five-star review titled, “Keeps Me On Track” by PinkFlamingo823. "I love this podcast. It's so informative. The guests are amazing, and your voice is so easy to understand. When I feel like cheating on my diet or feel unmotivated, I listen to an episode, and I get back on track."

SHAWN STEVENSON: Thank you so much for leaving me that review over on Apple Podcast. I appreciate it immensely. And keep them coming. If you get to do so, please pop over to Apple Podcast and leave a review for the Model Health Show. You can also do this on any platform you're listening on with... Just about. Spotify, I believe, just opened up for leaving reviews as well. Pop over, of course. Watch the video of this episode. We're doing some big things on YouTube. We just got the notice that our plaque is coming for 100,000 subscribers. Let's go. All right? So, we're doing some big things over there, so definitely pop over and subscribe on the YouTube channel. Got some exclusive stuff that's only on YouTube there. So yeah, lots of good stuff coming in 2022 and beyond. And listen, this episode right here? Timeless, classic, iconic. Our guest today is Dr. Casey Means. Casey Means, MD, is the Associate Editor of the International Journal of Disease Reversal and Prevention, and also the Chief Medical Officer and co-founder of Metabolic Health, the company Levels. She also regularly guest lectures at Stanford University, her alma mater. Her mission is to maximize human potential and reverse the epidemics of preventable chronic disease by empowering individuals with tools that can facilitate deep understanding of our bodies and inform personalized and sustainable dietary and lifestyle choices.

She's been featured everywhere from the New York Times to the Wall Street Journal, Men's Health, Forbes, Business Insider, and many more, and many published peer-reviewed articles

as well, and is such a gift to have on the amazing Dr. Casey Means. Dr. Casey Means, welcome to The Model Health Show.

DR. CASEY MEANS: Shawn, thank you so on for having me.

SHAWN STEVENSON: It's my pleasure. Such a great opportunity to have you in. I am so pumped about this episode. I want to start by asking you what can our blood sugar actually tell us about our metabolic health?

DR. CASEY MEANS: Blood sugar is an incredible biomarker because it's a read out 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 blood stream, 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 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 blood stream. Sleep also has a profound impact on 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 read out in our bloodstream of so many different variables in our diet and lifestyle.

And so big picture, what it does is show us what's going on with our metabolic health. And we're hearing the term metabolic health so much more these days, thank goodness, because we're realizing that metabolism and 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 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 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 of chronic disease and increased longevity.

SHAWN STEVENSON: It's so powerful. That number is baffling. We're knocking on the door, about 50% of our society having type 2 diabetes or pre-diabetes. We're very, very close. And again, if we just use our basic awareness and look out at the world, we can see that we're not in a good place. And as you mentioned, I love that you brought this in here, that it's the leading cause of death. This is one of those things that if we're paying attention to helping to normalize or optimize our blood sugar, it's going to help to reduce the things that are really taking us out. Another one that's... And I had to look this up recently, but as of this recording, liver disease is number 11. So, it's knocking on the door, again, as jumping into that top 10 causes of death. And our liver is massively important in this grand scheme of things with our blood sugar as well. So, let's talk a little bit about how the liver plays into this.

DR. CASEY MEANS: The liver could not be more important when we think about blood sugar. This is really one of the key organs in our body that helps us manage our metabolism, that helps us process energy in the body. It's an organ we don't think about all the time. I don't think we're all walking around thinking about our liver, but it's one that we should. We should be thinking about our liver health really every single day. And one of the key things here is actually not just glucose, but it's fructose. So, fructose is something that we are getting way too much of in our culture, and if you think about table sugar and the sugar that's added to most processed foods, it's sucrose, and sucrose is half glucose, half fructose. So, we're getting this huge glucose and fructose load whenever we're really eating processed foods that have added sugar, and I believe that 70% of processed foods have some added sugar in them. So that's a ton of glucose and fructose, and what fructose does is it goes straight to the liver, and as it's broken down, it actually creates a by-product called uric acid.

So, fructose gets broken down, creates uric acid. And that uric acid in the liver actually goes into the mitochondria, which are the little energy-producing factories of the cell, and it causes oxidative stress. It causes this damage to the mitochondria that makes our mitochondria less effective at doing what they're supposed to do, which is producing energy. It creates cellular dysfunction in the liver, and so instead of actually processing glucose effectively, the mitochondria, when they're dysfunctional, will turn glucose to fat. So, then we get fat build-up

in our liver cells, and we get fatty liver disease, which is now affecting over 30% of American adults. It's this silent epidemic that's happening where our livers are essentially becoming dysfunctional because of this huge amount of fructose that we're eating, therefore causing oxidative stress in our mitochondria, poor glucose management, shunting glucose to fat, creating organ dysfunction, and then what happens is our liver becomes insulin resistant.

That fatty liver disease causes insulin resistance in the liver. So now you've got this organ that essentially is resistant to this hormone, insulin, and I think probably most of your listeners are very familiar with what insulin does. But when glucose goes into the body, insulin rises to help glucose be taken out of the blood stream, shuttled into the cells for use. So, if the liver is more insulin-resistant because of what's happening with fructose, your body is having to push out more insulin to get the same amount of glucose into the cells. So now you've got basically dysfunction in taking glucose out of the bloodstream and into the cells because of that insulin resistance. So, because of table sugar, because of sucrose, because of this massive amount of sugar that we're eating in our diets these days, we're creating liver dysfunction, which is then causing and worsening glucose dysfunction all through this web insulin resistance. And you'll see many different stats out there about how much refined sugar we're eating per year, but some will say we're eating about, depending on the study and how you're measuring it, somewhere between 60 and 152 pounds of added sugar per year in our diet.

Probably 100, 200 years ago, you were eating less than maybe a pound per year. It just wasn't accessible. But now, because our government literally subsidizes the production of high fructose corn syrup and sugar, that's a whole other conversation. But we are eating so much of it. It's cheap, it's accessible, it's everywhere, it's in all our packaged foods, and so our bodies are overwhelmed with the substrate, and it's leading to cellular dysfunction that's setting us up for insulin resistance and glucose dysregulation. And the best thing we can possibly do, I think, for our health to just have a wide variety of benefits is to reduce that added sugar consumption, absolutely.

SHAWN STEVENSON: Yeah. You just said it, it's added sugar. We're not even talking about the naturally occurring sugar that's in the food stuffs as well. It's nuts to think about it, and this has consequences. And I'm a big proponent of us just looking at the results. Let's actually look and see, are we doing okay as a society? And I love how you articulated with the liver, and I want everybody... You might want to even rewind that back and listen again with this interaction with the liver in our blood sugar, because our liver, and I've said this before, this little kind of a parody, or beauty with the liver. If the name itself, live is in the name. Liver, without your liver, it's a wrap. Your liver and your brain are at the very top of the list, but our liver doesn't really get a lot of respect, and it's such a regenerative and forgiving organ as well. And so, you mentioned fatty liver disease, but specifically we're talking non-alcoholic fatty liver disease. We knew about the devastation from alcohol with the liver, but non-alcoholic fatty

liver disease, so this is really driven by our consumption of these added sugars, where the liver can just literally start printing out fat lipogenesis, and also with its really incredible intelligence, it's always trying to figure out how to keep you alive and keep you safe.

We've got this rampant blood sugar issue still. Your liver can start packaging things up and start printing out VLDL particles as well. So, let's talk about that. This is increasing our risk of cardiovascular disease.

DR. CASEY MEANS: Absolutely. So, when the liver is not working properly, we're not really processing glucose effectively, it's going to be converted to VLDL or Triglycerides, and this is a part of our blood panel that we all need to zero in on more. We may not always see VLDL on our blood panel, but triglycerides is something that we can look at that gives us a signal of this. And so your standard cholesterol panel is going to have total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides, and our doctors are always going to focus on that LDL cholesterol, because this is the one that we have a medication for, we've got statins, but if you actually look at the odds ratio of risk for cardiovascular disease, triglycerides, which is this repackaging of sugar to fat, actually it's more correlated to heart disease, even than LDL, and this number, when I look at that number, if it's really above 100, I'm thinking that this person is probably... There's something going on metabolically that's a problem, maybe there's too much added sugar or fine carbohydrates in the diet, it's really a signal to me of something going on with blood sugar and carbohydrates, and what's amazing about triglycerides is that it can drop so quickly when we clean up our diet, and we avoid the refined processed foods.

I've seen patients actually drop their Triglycerides 100 points in a month from just cutting out refined sugars and refined carbohydrates, and that is just a ticket to having better outcomes in terms of diabetes, obesity, heart disease. So, something that's really a useful thing to do is zero in on your triglycerides, it's going to say on the lab slip that under 150 is normal or in the green, but really closer to 100 or less than 100 is where we want to be. So that's definitely an important lab test, and then of course, on the flip side of that is HDL, which people call our, are good cholesterol, we want that one higher, and right now, the average lab slip is going to say you want it somewhere above 40 or 50 depending on your gender, we really want that in the 70s, 80s, 90s. So, LDL, important, but zeroing in on HDL and triglycerides can really actually give us a better picture of our metabolic health.

SHAWN STEVENSON: Absolutely. And this is something that's so within our control, especially, when we're talking about triglycerides. And just to map that out a little bit more, so we're talking about very low dense lipoproteins, so this is the particle size, so this is more correlated with an increased incidence of maybe something getting stuck somewhere and creating a blockage, but at the end of the day, it's like what is actually tearing up our circulatory system in the first place? It's sugar, triglycerides are a great marker for us to pay attention to, so this

is really turning things on his head, and I just want to dig a little bit deeper here, because cardiovascular disease, contrary to popular belief, is still the number one cause of death in the United States overall, and in this past year, in 2020, well, now we're jumping to 2022, but in 2020, on average, we were seeing about 630,000 deaths from heart disease, the last couple of years prior, it jumped up to most 700,000 and you've barely heard of peep about it, and a big causative agent here, if we're looking at, when we think about cardiovascular disease, I'm going off of what I was taught as well, looking at blood pressure, we're thinking about hypertension, and we're not thinking as much about the blood sugar, but it's the same blood, it's the same circulatory system that's handling all this stuff.

And so, could us targeting and helping to modulate and improve our blood sugar, could that help to dramatically reduce our risk and just these the number of people we're losing from heart disease?

DR. CASEY MEANS: Oh, unquestionably. Glycemic variability, which is the sort of fancy term for basically just big ups and downs swings in your blood sugar, so your blood sugar is changing all the time in relation to what you're eating and what you're doing, again, that's a read out of many different things like your stress, sleep, exercise, food. When it goes up and down in big peaks and valleys, that's called increased glycemic variability, and that's an independent predictor of developing heart disease, and there's many reasons for this. Those big swings in glucose, let's say you just sit down and eat a whole bag of chips, which has tons of easily accessible carbohydrates.

SHAWN STEVENSON: What kind of chips?

DR. CASEY MEANS: Just like potato chips, basically.

SHAWN STEVENSON: Okay, so just the regular Lay's.

DR. CASEY MEANS: Yeah. Or just really anything made with white flour or something that's going to have this easily accessible blood sugar, you're going to probably see that big spike in your blood sugar and that's glycemic variability, that's going to set off a lot of different processes in the body, potentially five processes all of which can contribute to heart disease, the first is that that can cause inflammation, the body sees this big spike in blood sugar, it's like, "What's going on? This is not normal, this is not our normal homeostatic baseline," it's a little bit of a threat signal to the body, so that big spike can cause inflammation, it can also cause glycation. Glycation is the process where sugar in the bloodstream, excess sugar, because they're so much floating around, it sticks to things in the body, it sticks to proteins, it sticks to fat, it sticks to cell membranes and causes dysfunction, you don't want sugar sticking to things, and so when the higher concentration of blood sugar is present, it's going to happen

more, and that causes cellular dysfunction. The third thing you do is cause oxidative stress, this is metabolic processes, when the body's sort of working harder metabolically, it's going to create metabolic by-products that are actually reactive free radicals and that is called oxidative stress, so increased glucose can cause more of that, which we know is also one of the sort of pathophysiologic root causes of heart disease.

And then the fourth thing it does, of course, is cause the body to release insulin. A big glucose spike is going to cause a big insulin spike, and typically the insulin spikes are pretty proportional to how big the glucose spike is, and so that again is the hormone that's telling the body, get the sugar out of the blood stream into the cells, insulin is that key that unlocks that ability. We have that big insulin surge over time, like we talked about earlier, that's going to generate insulin resistance over time, 'cause the body sees so much insulin floating around, it's like being forced to drive so much glucose in the cells, the cells are like, "Woah, stop, this is too much," and it actually puts a block on that signal and the body is like, "No, we got to get that glucose into the blood stream." So the pancreas, the organ that secretes insulin, starts pumping out more and more and more insulin to drive the sugar into the cells, but that whole ratcheting up process, that insulin resistance, that's really what drives us towards glucose instability, and insulin, aside from driving glucose in the cells, has many other effects in the body, so when it rises, that has an impact on things like heart disease, because one of its functions is like it's a pro-growth signal, it's a signal that tell cells to grow, it's anabolic.

And one place it can do that is in the blood vessel walls, it can create endothelial blood vessel growth and dysfunction kind of narrowing, and that of course can be related to heart disease. So, there are all these different things that happen just from blood sugar spikes that can lead to heart disease. And yet, how often do we hear about blood sugar as a thing that can improve heart disease outcomes? Very rarely, we actually hear so much more about salt and how that can impact things, but in my opinion, one of the best things, absolutely best things, we could do to reduce our heart disease risk is to get the blood sugar into a much more stable gentle rolling hills situation, not the big peaks and valleys. And that's one of the reasons I'm a big proponent of monitoring your blood sugar, is that if you can actually see how foods are affecting your blood sugar, see which foods are causing those big spikes for you, therefore causing those big insulins, so just you can learn how to eat in a way that keeps your blood sugar in that stable and more healthy, healthy range.

SHAWN STEVENSON: Casey, this is the number one cause of death in our country. And this is something we can do something about, but we've really been inundated even with our very sophisticated level of technology and advancements we've made, we're throwing drugs at the situation, statins, lisinopril, trying to target a symptom instead of proactively, what are the basic things that our genes expect for us to have a healthy expression? And just to put the icing on the metaphoric cake here, when we're experiencing this insulin resistance, which

organ is taking the brunt of this abuse is going to be your liver trying to manage and figure this stuff out, it's even responsible substantially for the breakdown of insulin as well, so this just compounds... Everything is existing within the same amazing body of ours, but we tend to compartmentalize things. And what's different about you and this is what I want to ask you about next is, if you could share your background and how you got interested in health in the first place. Was little Casey run around with the little stethoscope? And also, through your education process, unlike for a lot of our friends and colleagues, we see that, again, we're inundated with a certain way of thinking, you start to really pay attention to human nutrition at some point, so let's start with little Casey, what got you interested in health? And let's talk about your background and what got you to where you are now.

DR. CASEY MEANS: Yeah. A little Casey and adult Casey has always been completely in awe of the human body, it's one of the most beautiful complex systems in the universe, and I've always wanted to learn about it and understand it. When I went to Stanford for undergrad, I was so lucky 'cause it was right in the middle of the personalized genomics revolution, 23andMe was starting, the Human Genome project was wrapping up, and we were starting to really understand that more about our genome, but also that genes are not our destiny, that so many of the environmental factors around us, like what we eat, what we put into our bodies, what we expose ourselves to, the environmental toxins we're surrounded by, our sleep, our stress, our exercise, that all of these things actually change the expression of our genome, they change the folding of our genome, it's incredible, and that's something where we have agency, something about thinking about genes as our destiny takes away agency, but when we learn the impact of the environment on them, we realize there's so much that we can do to get the outcomes we want.

So I'm learning about this in undergrad, and one of the things that was really awe inspiring for me was the study of Neutrogenomics, which is the study of how food compounds, food chemicals go into ourselves and actually change gene expression, so then I started thinking, "God, we put a couple of pounds of food into our bodies every day, the average American eats one metric ton of food per year, that is all." We call it food. But what is it really? It's molecular information, it's all just chemical compounds that we're putting into our body that both build our body, but also tell our body what to do, it's so cool, and there's tens of thousands of chemicals in every piece of fruit that you eat. And what I kind of started to realize was that there are certain foods that do a lot of good for our genome and there's foods that don't, and it's often the beautiful plant foods that have all these little molecular compounds that go into ourselves and do amazing things. Let's just talk about turmeric, for instance, turmeric has curcumin, a chemical compound in it that goes into ourselves, changes the expression of the NF-kappaB pathway, which is one of our core inflammatory pathways in the body, it down-regulates the expression of pro-inflammatory genes through this food.

That is power to know that because we know, of course, that inflammation is one of the root causes that link so many of our chronic illnesses, not to mention a baseline pro-inflammatory state is known to be associated with the worst COVID outcomes. So let me think about like, "Oh, there's foods that actually can down regulate this in our body." So flash forward, several years, I go to medical school, and then I go to residency and I did five years of training and I had a neck surgery, ear, nose and throat, and something that really struck me, so I'm four years in a medical school, a little over four years into my surgical residency, and I feel very far from that inspired college student that I was that was thinking about all the things we can do in our choices and our behaviors and our food choices to impact our health, because what I'm seeing and what I'm noticing is that everything I'm doing as a clinician, as a surgical trainee is reactive, it's about doing stuff to the patient, it's about waiting until diseases and symptoms emerge and then swooping in and giving a drug.

And if drug doesn't work, a surgery to sort of help manage what's going on, but I'm not doing anything in my practice, and I actually haven't really been trained in my medical training to think about what can the patient do, what can this individual do in their life to optimize their cellular biology, to maybe prevent us from getting to this place where they have to go to the operating room? And that was a real reckoning for me, sort of seeing how reactive the healthcare system is, and also how much we really benefit and profit off of being reactive. In our current healthcare system, the way the incentives are set up is that we get paid for volume for seeing as many patients as possible, generating as many billing codes as possible and doing things to the patients. Surgeries are very, very lucrative, but built into that structure is to really wait for things to emerge and then react to them, and I just really realized that that's not the type of medicine that I want to be practicing, it's very paternalistic, it's reactive, it's not really empowering the patient to stay out of the doctor's office.

Ultimately, for us to kind of fix healthcare, we need to fix health, and you can't fix health without fixing cellular biology, and the only real way we can fix cellular biology is by people making choices day in and day out that put the right conditions in the body to optimize health. And so, practically speaking, I was in the hospital, and I was treating all these conditions that were fundamentally rooted in inflammation, you think about things like, what does an ENT operate on? Sinusitis, laryngitis, otitis, thyroiditis, it's like all these itis-es, that suffix in medicine means inflammation and not once truly was I trained or taught to talk about why is there inflammation, what is causing this inflammation? I sure knew how to reach my prescription pad to prescribe steroids to tamp down that inflammation, I knew how to bust into a sinus or an ear and suck out pus, which is inflammatory infiltrate, inflammatory goo essentially. But I did not know what was causing that inflammation, and that is a problem. If I went to Stanford undergrad Stanford Medical School, I don't know why these people are getting inflammation, that's a problem.

And that really started a journey for me where I feel like I kind of woke up and I started just asking why for everything, and one of the things I realized was, "Okay, you look at sinusitis, for instance, and we have all these studies in England Journal of Medicine that look at the inflammatory cytokines that are in the nasal tissue that cause that inflammation that leads to sinusitis." It's things like interleukin-6 and TNF-alpha, these inflammatory cytokines. Then step back and look at all the other chronic diseases we're dealing with in the country, obesity, diabetes, heart disease, Alzheimer's, the same inflammatory cytokines are upregulated in a lot of those diseases, and yet in our current medical system, there's 42 medical specialties, we're all focused on these little teeny parts of the body, I'm focused on these tiny little ear, nose and throat, totally missing the forest of the trees on how there's a huge amount of connection going on between all these different systems, and what that really woke me up to was more of sort of a systems biology approach to medicine, what are the things that are linking disease, not just treating everything like separate things and separate silos where we play Whac-A-Mole medicine with each medical specialty?

What is connecting things? And when you look at that level, there is just a handful of core physiologic pathways that are leading to the majority of chronic disease we're seeing, inflammation being one of them, metabolic dysfunction being another one of them. And so, long story short, I thought, "How do we attack at that level? How do we look at the connections between diseases and start really helping people figure this stuff out?" Because when it comes down to it, the way to approach these core pathways is to help people figure out what decisions to make in their daily life that optimize their physiology. So that's how to eat, how to sleep, how to manage stress, how to exercise, how to optimize your microbiome, so it became really my life's work to figure out how to empower patients on the frontend to make the decisions in their life that actually lead to better physiology. And so totally left the surgical world and really focused on how to empower people with their own health information to make better decisions, and that's, of course, what led me to start my company Levels with my amazing four co-founders and to really focus more on a root cause approach to health that is patient-empowered and that is proactive.

SHAWN STEVENSON: You're the best, by the way. Let me just say that first and foremost, you got into the field to help people, and you just articulated so wonderfully, and we've heard this again and again from many of our friends and colleagues, that the way that things are constructed, it doesn't mean that you don't have a huge heart and a desire to serve, it's just we're lacking a certain skill set, and also the system itself that we're operating within, there are so many constraints, there's a standard of care, and also we're operating on volume and not quality often times, and we're coming in at the very end of things instead of like, let's proactively make sure we don't even get to this place in the first place, which would overall, of course, save the healthcare industry, which is $4 trillion business here in the United States, so much more money and lives are going to be saved. So, it's just reframing things, and so for you

to have the audacity to look at things in my big passion, well, one of my big passions has been Nutrigenomics, Nutrigenetics for about 15 years, just really looking at that from that lens and understanding we might have a...

I mentioned lisinopril earlier, for heart-related issues, cardiovascular issues, that we're talking about grams and micrograms of influence versus pounds of food, which one of these things is going to have... And not to say that the drug doesn't have its place, but which thing is going to have the biggest effect? And so, starting to look through that lens, but you mentioned Levels, which I have my Levels on right now, monitoring my blood sugar, and it's just been so enlightening to... And also, my wife uses Levels as well. And to be able to have this feedback and really for me, it's more of an affirmation. Because once you're really in tune with your body, which ultimately that's what it is, you're empowering folks to understand their body more, not to become neurotic and find another thing to worry about, but to pay attention to notice patterns and to optimize patterns for yourself. So, let's talk a little bit about Levels and what it does and some of the information that it can give us.

DR. CASEY MEANS: Sure, absolutely. So Levels is a program that allows people access to this amazing little device, a bio-sensor 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 bio feedback 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 is a little bit higher, they're going to say, "Oh, eat better, exercise more." But what does that mean? It really doesn't give us a lot of control or power in understanding things, and a stat that's really fascinating to me is that 49% of Americans go on a diet each year, so the 49% of Americans are trying to do better with their diet, and yet as a country, we are just getting sicker, we're getting heavier, our life expectancy is going down, we're going to be 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, I'm sorry, in the nutrition space, about what we should eat, there's a nutrition war is 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 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, you see that your blood sugar goes up 80 points, which would be a really, really high rise.

You can say immediately, and 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... Really go on any website that says, what's a healthy breakfast? It's going to say, oatmeal, but if it's causing an 80-point glucose spike for you, it is not a healthy breakfast for you, and that's what I learned for myself, actually.

I had about a 75-80 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 roller coaster, not to mention after a big spike like that, usually what you have is a crash, 'cause your body has 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, and they kind of need to take 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 Weizmann Institute in Israel. What they did was, they took 800 non-diabetic healthy people, they put continuous glucose monitors on all of them, then they give them standardized meals, so they all ate the exact same thing. Say, macronutrients and 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 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 100 points in their glucose.

And some people actually had equal and opposite reaction to different foods, so if you gave a person A, a banana and a cookie, they might spike to the banana and be flat for cookie, and person B would be the opposite, and then they looked at what actually was determining those outcomes, and they came up with over 100 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 there is this personalization of diet that I think can be really, really powerful, and there may just be land mines that we aren't aware of that are thwarting our goals, whatever they are, our weight, performance, avoiding the chronic disease, with just a quick look at your data, you can kind of figure this out, and I think bigger picture, the thing, you really nail 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 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 is 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 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 us not really knowing 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, an 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, in 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 in-fighting taking place because everybody thinks that their diet framework is the end all be all. And that's the problem. We're fighting about minutia at the top and missing on the fact that most people are consuming a load 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 right now, Levels is currently running a closed beta program, there's like 160,000 people on the wait list, 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 a club, come right in. You get to jump the line and to take advantage, and right now and be a part of this incredible beta process, and the technology is already so wonderful. I've gotten so much if folks can see on the video, you could see a little... I know my sleeves look tight, but you could 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 want to, 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 erratic 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 us, if you can, maybe the top five foods that maybe even were surprising to be problematic for the most folks.

DR. CASEY MEANS: Yeah, absolutely, so one of the things that we see, certainly across the board, is that processed foods cause a large spike, these ultra-processed foods based in refined grains and flours and whatnot, and sugars, and 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, so some of the ones in our dataset 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. So that leads us to something else that we've really seen in the dataset, 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 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 like a food category and see that there's quite a big spectrum in responses, so for instance, like sushi. People who just log sushi in the Levels community tend to have quite a large glucose spike, well over 30 milligram per deciliter 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 sashimi 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 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 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? One that's really fascinated me is nutrition bars, so you go into Whole Foods or Erewhon or whatever, and there's like 100 different bars you can get, like lunar bars, cliff bars, bulletproof bars, quest bars. There are 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 dataset 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 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 bio-feedback 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 datasets, 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 Google some recipe we want to cook for dinner, and a million recipes pop up, and we usually pick by how many stars does their reviews have, and does this have any ingredients I don't want to eat?

But, we're just a couple of years probably away, maybe less, from a 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 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 with marketing claims, because essentially marketing is going to become obsolete. The marketing is going to come from within, from how we respond to it, and so that really excites me, and I think when I scan the dataset of what's happening with just nutrition bars or brands of non-dairy milk, you see a big spectrum of what is causing 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 dataset, 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 food which have big spikes and dips across breakfast, there are clear breakfasts that are not working for people's blood sugar and clear ones that are. So, 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, that's what you're going to see behind the counter, we have normalized that these are breakfast foods. Cereal is another big one. Cheerios actually, specifically, is one that has a huge glucose response. So, for me, those are just kind of off to 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, etcetera. And so 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 a whole new world of how we're going to judge food and nutrition.

SHAWN STEVENSON: Yeah, this is so powerful, this is taking it from... Again, there's still a level of theory when we see a bagel, that I know that this is really high in refined carbohydrates and added this and that, same thing with pancake, but it's still a theory that this food is bad for me. Now you can see yourself what it's doing to your body, and again, we don't want to get to a place where folks are being neurotic or that this is the end all be all, and also, of course, this is individual regardless of any of the foods that you just mentioned, but just being able to get a beat on things, because I think that ultimately, what we want folks to be able to do, because we already know that waffle is probably not the best thing for you, but now we can start to listen to our bodies, get to a place where we can listen to our bodies, and if we have the waffle, no, we want to get to a place really, and this is what I think the greatest gift is with Levels, it's

getting your body to a place where there's a healthy metabolic range that your body is staying in with your blood sugar, it's managing things very well.

You're in a good state of health. And so that when you do have the waffle, it's not just totally messing you up, like your body can clean house, get things back to baseline with some grace. And so, I think that that's one of the great gifts. And also, you mentioned some of these foods that tend to be some of the biggest influences of arrangement, potentially, again, from all your datasets, and I love that you mention this, so it's not that the oatmeal is going to be... 'Cause I know some folks are like, not my oatmeal, you'll never take it from me, whereas like, What if we have the oatmeal and you add some protein along with it, or you have the oatmeal and you add some almond butter, mix that in there, or you've got... I love Acai Bowls, I'm super into that. Just the last couple of months I took my family to Huntington Beach for a little staycation over the summer, and we got some Acai bowls, and I was like, I could do this better, and so now I blend the Acai with protein immediately.

DR. CASEY MEANS: Yes.

SHAWN STEVENSON: So I'm blending with protein, some nut butter, bring down the glycemic spike, and now also with Levels, I can track this and see it first hand, and it's just such a wonderful thing, and also with grapes, these are foods that we tend to eat in isolation, as you mentioned, so let's take that out of the context, unless your body does well with it, which is cool, we got to understand, even the grapes that we're eating, they're not the same grapes that are in the historical references, there would be seeds there, you know, and so you would also have to slow down or you're jumping through some seeds, we could just pile on a bunch of grapes really quickly, and what if we take those grapes, if you still want to get dabble in some grapes and cut them up, throw them into a summer salad or something like that, so just getting this data and being able to become more intelligent in our choices and creative and expansive, I don't think this closes a door on things, I really think it opens the door for much more.

DR. CASEY MEANS: I think you brought up such an important point, which is, this is not about restriction or elimination necessarily, this is about awareness, this is about informed choices, this is not about never eating a waffle again, but it may mean that, Oh, I'm going to try Birch Benders keto almond flour waffles instead, and see how that works for me, or I'm going to eat the same waffle, but I am going to do some things around it that make it work better for my body, like add almond and butter on top of it, add chia seed, take a walk after the meal, just a simple 15-minute walk after eating a high-carb meal can have a significant impact on lowering your blood sugar from that meal, 'cause again, you're soaking up that glucose out of the bloodstream into the muscles for use. And the really cool thing about muscle is that unlike almost every other tissue in the body, muscle can take up glucose without the action of insulin,

just the muscle contraction alone can allow for glucose to be taking out of the bloodstream, so it's like a freebie, like use it, use that, you use those big muscle groups and even a two-minute walk every half an hour throughout the day can statistically significantly decrease your 24 hour glucose levels compared to people who are more sedentary throughout the day.

So, this is like just use those muscle groups, do a few squats after your waffle, whatever. And there's so many other things you can do. You could take, for instance, an apple cider vinegar shop before your waffle, we know that vinegar actually tends to have an effect of lowering our glucose levels, you could pre-load your meal with some vegetables, have a little... I don't know if you were to have a salad before breakfast, but not really, no, I think in our role, I'd be happy to do that, but put something in the stomach before eating the carbs. So what I'm trying to say here is that there is this whole context around these foods that you can do to enjoy that food and have less of a glucose spike, and so there's just a whole tool box we have to basically minimize that response, so it's not so much about restriction as it is about context, about awareness, and I would say personally, in my own life, I really think about sleep and stress as well when I'm choosing what foods to eat.

If I have had a Fortnite sleep, I typically wear a WHOOP strap, and we actually did a small pilot with WHOOP, which is one of the wearables that tells you about sleep and activity, that showed that the WHOOP Recovery Score, which is a marker of your sleep quality, your resting heart rate, your heart rate variability and your respiratory rate, that actually correlated with your glucose variability the next day. And so, if my sleep is poor for whatever reason, I stayed up late working or whatnot, I know that I'm going to try and be a little bit more cognizant of what types of carbohydrates I'm eating the next day, 'cause I'm probably going to have more of an erratic response to the same food after a poor night of sleep. So, same if I was quite sedentary the day before, the next day, I'm probably going to avoid the higher carbs, higher spiking foods for me, 'cause I know I'm going to basically have a worse impact, so just setting up that whole context around what you're eating, it makes it really fun.

And again, like you said, it's not about restriction, it's about pairing things really thoughtfully to create the best metabolic impact for our body, and it's also not about just like trying to game the system with super low-carb foods or low-carb bars to keep our glucose flat, you could chug canola oil and your glucose would stay flat, that doesn't mean it's healthy, it's about holistically building a healthy body that processes energy effectively, that is the goal, and that is what our program in our app is really trying to drive people to do by taking in other data streams as well, we take in sleep data, we take in step and heart rate data, so that people can build this holistic context, and I think the future is really exciting because right now, the only continuous biomarker that we can track is glucose, that's the only sensor that's available for use. But in the future, like what if we can check inflammatory markers, what if we can check by-products of fructose metabolism in the bloodstream? We can see a more holistic picture

about foods do into our body, and I think that is really the future is more continuous biomarkers that let us make these decisions in our lives for optimal health.

SHAWN STEVENSON: This is great, this is such a great segue because I was going to ask you about outside of food, which food is kind of that tangible thing, we could see the food, we eat the food, we have a relationship with it, but we don't think about the metabolic implications of stress, because it's invisible, in a sense, you can't really touch it, you can't eat it, you can kind of stress eat, but you're not eating stress in a sense. Sleep deprivation, same thing. And for me, in looking at my data, there was one particular day that I was dealing with a random stressful thing, and this was the one day that my blood sugar was bonkers, it was stressed, a matter of fact, I was intermittent fasting, and the stress thing happened, and my blood sugar went up significantly, I'm just like, What the? But then again, if I'm listening to my body, I already knew that's why I checked it at that time, it's just like these catecholamines that I'm producing, the stress hormones, they might be like, let my body know like, Hey, there's a stressful event coming, fight or flight scenario, because our biology, even though we believe we're so evolved, we have very primitive out-picturing and processing, and so this fight or flight feeling that I'm getting, it's getting my body prepares like, Hey, it's got some stuff stored in these muscles here, some glucose, let me go and unlock that and put that in his bloodstream because he might need to roll out.

And so, to get to see that first hand, I was just like, Wow, that is so nuts. And so, but here's the thing, even with that, I'm still empowered, I don't have to be a victim to this stress and also stresses in bad it's going to happen in our lives, but I have tools to reframe things even in that moment or to take some breaths to just tickle the parasympathetic nervous system a little bit in that moment versus just like the sympathetic dominance taken over, we are so powerful, we just kind of, again, outsource our biology to the external world when all of this is within us. So, you mentioned sleep deprivation being one of those things, let's talk about stress in the context of our blood sugar.

DR. CASEY MEANS: Yeah, stress is a really profound variable in what our glucose levels are doing during the day, and something I really tell patients and that I think is important to know is that you could have the perfect Metabolic Diet, everything is totally dialed in, but if you're not managing your stress, you are not going to be... Absolutely metabolically healthy. Food is necessary, but not sufficient for optimal metabolic health, again, we are a whole complex system, this is not like everything's separate, stress, sleep, food, exercise, these things all weave together in this incredible hormonal chemical milieu that leads to the outcome, so you've got to think about each of them, and how they relate to each other. So, with stress, you really nailed it. I love how you put it, it's telling the body like we might need to roll out, and so we need some energy available to feed these muscles, so our liver stores a few hours' worth of really quickly accessible glucose for energy for emergencies like that. It's in a storage form

called glycogen, and when your stress hormone release catecholamines, cortisol, it goes to the liver and it tells the liver, dump that stored glucose, break that linkage down, put it into the bloodstream so that our muscles have a quick source of energy for mobility.

And that's an evolutionarily advantageous thing, if you're being chased by a lion, you want that glucose to dump so that you can use your muscles, unfortunately though, in our current world, we are under chronic low-grade stress, basically all the time, the text digging going off, the honking, the emails were getting constantly, the body doesn't really realize that this is not a lion chasing you, it's the same threat signal, we're not safe, and it's happening all the time, not to mention biologic forms of stress, the toxins in our food, water and air. Even being sedentary is kind of a form of stress for the body, so it's coming at us from all angles, and we're constantly just like you said, hitting that sympathetic nervous system button, and so that can kind of create a situation in which we're just constantly keeping the blood sugar a little bit elevated. I have noticed myself, the very first podcast I did a few years ago, I was really nervous, and I looked at my blood sugar afterwards, and I was totally fasted, I went up like 40 points. It looked like a food spike because of that cortisol catecholamines, liver dumping, etcetera, and so we want to do whatever we can to avoid that, and beauty is there so much that we can do about it, we can, as you said, tickle the parasympathetic nervous system, and we can do that with pride intruded practices like breath work.

So to me, I'm really using my glucose monitor as a mindfulness biofeedback to him now, and when I see or feel that I'm under stress, I will just immediately go towards that deep diaphragmatic breath, whether it's a deep for breath, inhale for breath, exhale or a 2-1 ratio of inhale exhale, do 10 deep breaths, I can feel my body change immediately in terms of how I just subjectively feel, it's that beautiful release of calm, but I also know that it's doing something good for my blood sugar because of what it's doing, 'cause it's translating to my body that I'm safe, it's changing the hormonal milieu in my body saying, you're safe, there's not a threat, we don't need to mobilize energy for your muscles, you can simmer down, and so that's been something really super powerful for me about the link between blood sugar and stress, and of course, it all comes back to some of these ancient practices like breath and just getting ourselves in our body into a state of realizing that it's okay.

SHAWN STEVENSON: Yeah, you can share me before we get started, that even proactively doing this before you eat your meal can improve your body's response to said food afterwards, and if you think about... Well, first of all, can you share a little bit about that and then I'll share an example that it reminds me of.

DR. CASEY MEANS: Yes, absolutely. So there actually have been research that's shown that in people with type 2 diabetes, just mindful eating, so really getting centered and sitting down and relaxing and taking a few deep breaths and taking a moment to look at your food,

appreciate the food, have a gratitude for the food, look at the colors, the smells, the textures of what's in front of you just for a couple of minutes can actually significantly reduce the glycemic impact of that meal compared to if you just plow into that meal essentially mindlessly, which is how I think many of us eat a lot of the time, eating on the go, shoveling food in our mouth while were eating. I think about surgical residency when I was like, I don't think I had a single meal sitting down for four and a half years, I was on the staircase, like eating food in between surgeries just shoving... The cortisol was high, my body was not in a rest-and-digest state, and I'm sure it had an increased impact on what the glucose was doing, and so that's a definite thing I would recommend to people is that it's not just fuzzy advice to say, mindfully eat. There's a real impact on what's going on with our hormones and the way we're digesting food, and so you can just sit and maybe practically speaking, take 10 deep breaths into your belly, take a moment to express gratitude for the food and then eat, it can actually have a significant impact on how your blood sugar raises in response to that meal.

SHAWN STEVENSON: Yeah, and if you think about just this concept of taking a moment to pray before you eat, for example, that folks have been doing for centuries, that's kind of calming down, getting centered, going within, and allowing for the parasympathetic door to open because it's really a binary system by the way, you can't do both at the same time. And I think that a big reason, as you just mentioned, you said plowing through, which is a great term, is like we're just... Because of our constant fluctuations in our blood sugar when food is around, it's just time, let's go for it, and I know I've had those moments as well, but every time I eat, I take a moment. Even if I'm in the middle of a restaurant, I close my eyes, just take a moment, I give thanks for the food. And take a couple of deep breaths and just become centered, it's just like the channel gets changed and reality for me, and suddenly the food is here, it's just like a completely different experience, because I just want to plow into that food, especially if you're hungry. That's another thing, getting ourselves to the point where we're “starving”, which we're not starving, then it's going to increase the incidents where we don't take a moment just to stop, because we tend to think like, this food is in front of us, is the last meal you got to go for it.

And so this provides, again, more empowerment for us, and also it brings us back to more humanity because we have something going on today that we didn't have before, which is even while we're eating, our minds are getting outsourced, it's not like we're having the meal in a parasympathetic around good friends, having a conversation, or just being there present with our foods, we're probably working. As you mentioned being in the staircase, my wife shared the story, she actually told me yesterday, she was like, “Babe, did I tell you what I used to eat for lunch?” When she was in high school, multiple times a week, I think she said every day, which is scary, but then again, she had her mom cooking these incredible Kenyan meals for dinner, but she said every day she had a Rice Krispie treat and a Snicker bar for lunch, and eat in the staircase, right? Because she was coming from Kenya, she's feeling like she was not

fitting in, and I'm just like, “Bro, how did you survive?” But then again, it's going to get balanced out somehow, and I think that if we can reel it back in a little bit, and it's not that you can't have a movie night and eat your dinner, whatever, but if that becomes the norm where your mind is somewhere else than with your food, or with what's happening in reality right there, it's probably not going to have a good out-picturing for our body's response, and so I love this so much.

And one of the other things that I want to ask you about is, and this brings to light something so powerful, I've been talking about this for years, literally since the first year of The Model Health Show, because we still can get tunnel vision when it comes to food, and think that this is everything, which I know that I'm guilty of that because I'm a nutritionist, so food to me was everything. This is the end all be all. But in reality, you can over each your way into creating excessive fat, you can under-exercise or under-move your way into excessive fat, you can under-sleep your way into excessive fat, and you can also over-stress your way into excessive fat, and Levels helps you to see that first hand, that your blood sugar can go nuts just when you're stressed, and if you're chronically in that state, which, hey, we're talking hundreds of millions of people are living in perpetual stress and anxiety, it's no wonder where in this place that we are, it's not just about the food, the food is a major portion of it, for sure, but this is bringing to light how stress and anxiety is such an issue.

And so, the thing that I want to ask you about, and it's going to all tie together, and especially for our time that we're living in right now and talk about solutions, the CDC's report, I've mentioned this several times and going to keep hammering this away till we get it, because something just happened this week that we talked about right before the show, reiterating this point. But they analyzed the data from 540,000-plus COVID-19 patients, over 800 US hospitals. The number one risk factor for death from COVID was obesity, this was back in July 2021. Everybody can see it, a published article, and the second leading cause of death was anxiety and fear-related disorders, the second leading risk factor for that, third risk factor was diabetes and its complications. So, the first and third is something like, Of course, we're not doing anything about it, but of course, but that middle one, the stress component is literally killing people, and I just read a paper this morning looking at an anti-psychotic medication and anti-anxiety medication, reducing the risk of death from COVID. And I'm just like, What the hell? Why are people not talking about this? Because anxiety, that anxiety is going to exacerbate your immune system, it's going to cause more dysfunction, we know about this, we have entire fields of psychoneuroimmunology, years of data. We know this stuff.

And so, this is what I want to ask you about, you mentioned this, that a new report just came out this week, finally saying, hey, you know, being excessively overweight is going to lead to worse outcomes from COVID and losing weight can possibly help to mitigate those things. It's just like we've been talking about this for a long time now. But with that said, obesity is

arguably the biggest risk factor for these chronic conditions as well, and as you mentioned, abnormal blood sugar ties in very neatly with that, so let's talk about this, how can we address our obesity epidemic? Because right now we're knocking on the door of about 250 million of our citizens being overweight or obese, and this is tied to over 400,000 deaths a year, at least, this is looking at, again, just the major things, diabetes, heart disease, not to mention all the other stuff, so what can we do in the scenario because our blood sugars, as you mentioned it's leading the worst outcomes with infectious diseases as well as chronic diseases, what do you want to see happen? What can we do to get our citizens healthier?

DR. CASEY MEANS: You brought up so many great points in what you just said, and I think the first is the concept of fear, which I'll just touch on briefly. I think one thing that people might not realize is that there's just such an incredible bi-directional relationship between metabolic health and mental health, actually people with metabolic dysfunction and blood sugar dysregulation have about twice the rates of depression and anxiety as people without it, and of course, when there's more fear and anxiety, it's going to drive that high cortisol and catecholamines state that leads us to be more metabolically dysfunctional, so they're very, very tied in to each other. And fear and sense of threat in the body and the mind, of course, is going to mobilize this inflammatory cascade in the body that says there's an issue, there's a threat, we need to mobilize our resources, like our immune system, which is the part of the body that fights threats, so we're living in this state where we're just creating the physiology in the body, in part by how we're thinking, that sets us up for dysfunction and concurrently that dysfunction is contributing biologically to what's going on in our mind.

So, it's just an incredible bi-directional relationship, but I think most people are not aware of, if you ask the average person with depression and anxiety, are you tracking your blood sugar, do you know where you stand on the metabolic health spectrum? I think the majority are going to say no, even though there's a strong both epidemiologic and mechanistic linking the two. So then moving into the question of COVID and what I'd like to see happen, I think you've touched on this so much in the show, and I think it's in many episodes, and I think it's so important is that we need to be talking at the highest level of public health about how important it is to optimize our metabolic health and our weight in order to make ourselves biologically resilient to face this virus. The data is so clear, I actually published a paper in the journal Metabolism, sole author paper about, and I submitted this in April of 2020, this was over a year and a half ago. It was published in print in June, I had basically just been reviewing the research up, and it started basically in February of last year about what was going on with COVID, and it was becoming clear that there were several biologic mechanisms that we're leading to worst outcomes in people with Type 2 diabetes or metabolic dysfunction, conditions like obesity.

And we even knew then that it was not just a correlation, but there were potentially causative mechanistic links of why people were doing worse. Now, which we're seeing a lot more, which is great, but for instance, obesity and diabetes create a baseline pro-inflammatory state in the body, people with these conditions have elevated immune chemicals like cytokines already in circulation, and we know that then when the virus affects the body, it mounts even more of an immune response and we get this cytokine storm that actually leads to the organ damage, it's the body's response to the virus, this overwhelming response that can cause the organ damage that leads to such severe morbidity and mortality. So, if you're at baseline in that pro-inflammatory state with elevated cytokines like Interleukin 6 and TNF-alpha and when the virus hits you, you're going to mount that exaggerated response that hits your organs, and this circles all the way back to like what we were talking about with Curcumin and Turmeric and NF-kappaB pathways, there are foods...

I'm not certainly not saying that Turmeric is going to prevent us from having poor COVID outcomes, there's no research to suggest that, but just the fact that what we're eating has a direct impact on these inflammatory pathways, on the levels of cytokines in our bodies that we know are related to outcomes, so that was one of the things that was a mechanistic link is increased baseline pro-inflammatory state in the body in the setting of metabolic disease, the second is that high blood sugar on its own can cause immune cell dysfunction, basically for an immune cell to work and to do its job, it has to get to the site of infection in the body, it literally has to move to the bloodstream out of the bloodstream into the tissue and fight the infection and the cells that are infected, and that's a process called Chemotaxis, which is the cells moving to the site of infection and phagocytosis, which is actually eating cells that are infected or eating viral particles, whatnot, and high blood sugar can directly impair the cells ability to both move and phagocytose infection, and so we literally stunting the ability of our immune cells to do their job just by having elevated blood sugar.

The opportunity here is massive, figure out how to keep our blood sugar under better control, and we know that it's going to have positive impacts on the body. And there's several other things that have come out, of course, that in the setting of diabetes, the ACE2 receptor, which may be one of the sites of entry of the virus, is up regulated, so you've got more of these receptors on the cell membrane that it makes it easier for virus to enter into cells. We also know that people with diabetes had higher sugar in their lung fluid, so the sugar's everywhere, right? It's going to go, and that higher levels of glucose sort of even in the lung tissue may have been part of what made... You have the lung tissue, so affected by the virus in people with diabetes, so all of this I went into in this paper a year and a half ago, and really the call to action was, we can talk all we want about mask, we can talk all we want about Clorox. We were talking at that point about cytokine inhibitors to help stunt cytokine response, but none of that, those are all reactive measures, none of those increased biologic resilience, and one of the things

that can is getting our metabolic health under control, which has all these multifarious effects on our immune system and how we're going to show up in the face of this virus.

Not to mention, it's not just about creating readiness and resilience in the face of COVID, every single flu season, people with type 2 diabetes or metabolic dysfunction have about a five-time higher rate of hospitalization mortality from these respiratory illnesses, so it's not just about this one virus, this is about in the face of any infectious agent, we want to be resilient. And so certainly, I think that every billboard in the country, should just have five steps of how to stabilize your blood sugar, it's not that hard, and what we know is that even for people with full-fledged Type 2 Diabetes, you can, in many cases, reverse that condition or improve the condition. That's not something we hear a lot. When I was in medical school, I definitely thought Type 2 Diabetes was irreversible. That is not true. And for those 80 million people with pre-diabetes, it's even more likely that you can reverse the disease. And so, I just think that we should be talking about this non-stop, what if the billboard out there or the front page of the New York Times every day said, "Hey, balance your meals, walk after meals, get good sleep, take deep breaths when you're stressed". Things that can actually improve blood sugar. That's what I would love to see.

There's many other facets of it, of course, but the baseline is we just need to be talking about this and what the data shows, and fortunately, there's people like you who are out there beating this drum constantly, and I think it's making a huge impact.

SHAWN STEVENSON: Yeah, thank you so much. And that's incredibly powerful. And again, the goal here is to be empowered and giving folks things that this moves away from fear because it's giving you things proactively, and here's the thing, again, we have literally thousands upon thousands of peer-reviewed papers on the efficacy of all these things of movement and the relationship with your immune system, with your mental health, the list goes on and on, with nutrition, with sleep, we know that these things work, but suddenly they've been just kind of silenced, none of these things matter, and instead do all these superficial things and missing the point, even if we're trying to drag away out of another situation, which we've not been successful doing this in the past, if you just look at the trajectory of our biggest killers, but we're still missing the point on if your metabolic health is not up to par you're not going to mount an appropriate immune response suddenly because you take a new drug, it just doesn't work like that. We're missing the point, we're leaving people to be disadvantaged instead of helping people to be empowered, and how do we get there?

Again, we are now at the two-year mark of COVID becoming a part of our lexicon, and just about two months here in the United States, it landing and starting to take over, not just being a part of our lexicon, but just a part of our day-to-day lives, so two years. And within that two years, we literally could have revolutionized the health of our citizens. I've seen how quickly

things could be mobilized. Again, this is two years into it, just last week, no, no, it was this week, I was driving home from the gym, in three different places, in my 12-minute drive, lines were wrapped around the block for COVID testing, around the block, three different places, people are standing in line with their mask on, waiting to get their test. And again, if people can get out in the middle of the day and go and do that, they can get out and go and go for a walk, or whatever the case might be, but the motivation has to be there from the authority figures, we're telling them what to do, because truly, people could have been checking in on their grandma just like grandma, did you get your 10-minute walk in today? You know that we got to protect you from COVID, we've got data.

We're here in LA, Kaiser Permanente is not that far from my house. The paper, and again this is back 2020 looking at the data, I believe it's 50,000 folks that they analyzed their data, they found very clearly... Then again, this is observational data, but they did a great job of adjusting for confounding factors, they had a category of folks who were active and the folks who were inactive, the folks who were regularly inactive had almost a three times higher risk of dying from COVID. And again, it's not that, it's because we tend to put these things in a camp, so you're going to exercise your way out of COVID? No, we're talking about becoming more biologically resilient, which defend you from everything in some context, and again, it puts the power back into your hand to be a stronger human being, to feel better, your mental health, it starts stacking conditions in your favor. That's really what it's about, instead of giving this one trick pony as if it's going to work, and again, if you just look at the order of things, we haven't been driving things in the right direction, but we can change that.

DR. CASEY MEANS: Mm-hmm.

SHAWN STEVENSON: And you are one of those people that I'm so grateful for you and for your work and for the audacity that you've had to like, you know what? This is where things really work, and this is where we're going to empower people, this is where we're going to provide real proven strategies for things to get folks to a good state of health. And if you can, can you let folks know where they could follow you to get more information, just get more into Dr. Casey Means world? And also, I'll throw it back as well to the link for Levels, again, this is very, very exclusive for us, you get to jump in front of this wait list, go to levels.link/model, so that's L-E-V-E-L-S.L-I-N-K/M-O-D-E-L. Casey, where can folks find more information?

DR. CASEY MEANS: Well, people can find me on Instagram and Twitter at Dr. Casey's kitchen, Dr. Casey's kitchen, you can find Levels at Levels on Instagram and Twitter, and really fun to follow levels, I think on Instagram, especially because so many of our beta customers, our beta members are doing all these experiments like we've been talking about today walking after meals, pairing their apples with almond butter, seeing how different types of exercise affect their health and showing it, and even if you don't have a monitor on, you can still learn from

these strategies that people are doing, you don't need to have the sensor to be able to take advantage of a lot of these pearls that we've talked about and that other people are sharing, so that's on Instagram and Twitter on the web, we're at www.levelshealth.com. And I highly recommend levelshealth.com/blog. Our blog is a huge investment that we've made at the company to bring in the key thought leaders in metabolic health to talk about a lot of the topics we've been talking about today, and actionable, practical tips that people can use to improve the metabolic health. Again, with or without a sensor on, and so that's a great resource, and yeah, and then you can sign up for our newsletter on the website as well, and we send out some really high-quality information about how to empower yourself to have the agency in your life to improve and optimize your metabolic health.

SHAWN STEVENSON: Awesome, well, Casey, thank you so much for coming through and hanging out with us. It's been such a pleasure, and again, everybody go to levels.link/model, you get to skip the line and get access to Levels now. So do that now. Dr. Casey Means, thank you.

DR. CASEY MEANS: Thank you so much, Shawn, thanks for all you do.

SHAWN STEVENSON: Awesome, thank you. Everybody thank you so much for tuning in to the show today. I hope you got a lot of value out of this. One of the most important conversations for us to be having right now is, how do we improve our metabolic health of ourselves, our families and our communities? This is the true testament of what real help looks like, of what resilience looks like in the face of chronic and infectious diseases, how healthy are we coming into it? And this is something that we can do something about. But we need to shift our focus. We need to provide empowerment, we need to stand on a firm place of logic and utilize things, and we have decades of peer-reviewed evidence, as the efficacy of right nutrition, of movement, of high-quality sleep, of stress management, and most importantly of the power of our mind, because our minds are really where all of this stuff is stemming from. Whether you see things through the lens of fear or not, are going to determine so many things that out picture with your body, because a thought of fear, a thought of worry and anxiety and things going wrong, it's going to release a chemical cascade in your body, it's going to change what your hormones are doing, your anabolic hormones might be suppressed, your catabolic stress driven hormones might be increased, your heart rate is going to change, your pupils are going to change.

Every single cell in your body is going to respond to that stress. From the very top of your head to the very tip of your pinky toe, all right? Everything is going to be influenced by the thoughts that we carry, specifically the habitual unconscious thoughts that we are operating from our beliefs, and so fear can be a viable tool for us to utilize and then bring a logic in a rational approach to. And of course, we have to understand, we cannot live in that state. Humans were

never designed to live in that state, they need to be in a place of growth and empowerment and moving towards health instead of just trying to move away from fear. So that's what this is really all about. And this is another really amazing tool for us to start to tune in and be able to affirm, to get accurate information on how our bodies are unique, metabolism are unique, metabolic fingerprint is responding to specific foods. So this is not about tapping into another thing to be neurotic about or to be in fear of, because there's even a place for you to get spiked out with the blood sugar, you know, but most importantly, it's coming into from a healthy state to where our bodies can balance things out, but for most folks, and the truth is, they're habitually living in this dysregulation of their blood sugar, this glycemic variability is just absolutely chaotic, it's just not there, the ability to stay stable to bring things back to a baseline in a healthy state.

And so getting this viable data, this feedback, we can start to pinpoint, and ultimately what I want to do is to move us to a place where we are listening to our bodies again, not necessarily needing different self-quantification things for us to feel healthy, and you don't need any one thing right now, even to do this, but I truly do believe this is one of the great tools that come along in recent history for us to guide ourselves to that place where we're getting viable, empowering feedback and tuning us back into how we feel, tuning us back into being able to analyze and understand the most important data that we exist within, which is paying attention to how we look, how we feel, how we perform, our bodies are always speaking to us, this is where we live, we live here, and ultimately, our greatest solution, our greatest help, our greatest success is going to be found by looking within, paying attention to the wonderful communication our body is always giving us, and unlocking and opening the door for real health to be a continuous unfoldment versus the alternative, which we've seen recently in human history, which has been an unfoldment of disease, of destruction, of degradation.

We can turn this thing around, I believe it. And it starts with us making the decision to be the healthiest, strongest, most resilient humans that we can possibly be. I appreciate you so much for tuning in to the show today, and if you got a lot of value out of this, please share this out with your friends and family on all the social media platforms, you can tag me, I'm @shawnmodel on Instagram and tag Dr. Means as well and let her know what you thought about this episode. And you can send this episode, of course, directly through the podcast app as well. I appreciate you so much for tuning in. We've got some epic shows coming your way 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.