THE MODEL HEALTH SHOW

EPISODE 524

How Time Restricted Eating Transforms Your Brain & Biology

With Guest Dr. Andrew Huberman

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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. Did you know that your brain can literally control how many calories you absorb from your food? I know this sounds crazy, but researchers at Yale University School of Medicine found that our Vagus nerve, which connects our gut to our brain... And here's the thing, what happens in Vagus doesn't stay in Vagus when it comes to this communication, and the Vagus nerve actually communicates information between your gut and your brain about the volume and the type of nutrients that you have available. And depending upon your nervous system's assessment of your nutritional status, so the perception of how much bank account as far as calories you have stored away, how many nutrients you have stored away, your gut is sending this data to your brain, and your brain can determine that you need to increase the assimilation of calories from the food that you're eating, or even decrease the assimilation of calories from the food that you're eating.

Alright, so it's not as simple and as black and white as calories in, calories out. It has a lot to do with the function of these powerful organs, specifically our brain and our gut, and that's what we're going to be talking about today, is this connection between our gut and our brain, and how certain eating protocols can influence this association. We're also going to be talking about the neurobiology associated with obesity; what's happening in the brain in that communication, and it's incredibly enlightening. We're doing this with one of the foremost experts on the human brain on planet Earth. And this is actually part two of this conversation, so make sure that you check out part one if you haven't done so already because we've really broke down how... Implements like sun exposure at certain times of the day dramatically impact our brain health and our cognitive performance, how even changes in our breathing can dramatically, instantaneously change what's happening in our brain and our cognitive function, and so much more. Alright, so you definitely don't want to miss out on part one, but part two, I'm telling you, it's even more incredible information and practicality on what we can do to optimize the health of our brain for the health of our metabolism, our immune system, and more.

Now, I want to reiterate a point from part one, which was how stress can actually be really beneficial for the function of our brain. But excessive stress can really, really be detrimental for our brain, and of course, all the downstream effects, from our metabolism to our immune system, and our cardiovascular health, the list goes on and on and on, based on our body's ability to manage and modulate stress appropriately. But key nutrient deficiencies are now clinically proven to reduce our brain's ability to actually buffer and manage stress. A recent study published in the Journal of Nutrition and Food Sciences uncovered that both emotional

and physical stress may affect a person's vitamin C status. Vitamin C is critical in helping our bodies to manage and modulate stress, and emotional and physical stress both can deplete our body's reserves of vitamin C. And by increasing these reserves of vitamin C, the researchers found that when stress depletes vitamin C levels in the body, it reduces the body's resistance to infections and other diseases, and it actually increases the likelihood of further stress.

So, when vitamin C is depleted from excessive stress, it reduces our resilience to stress even more, and this is where we get into that vicious circle of problems. And the researchers found that when vitamin C levels are addressed and practical vitamin C intake is increased, the harmful effects of stress hormones are reduced, and the body's ability to cope with stress improves dramatically. How is this pertinent information for this time right now? Well, a recent study published in the journal PharmaNutrition investigated the impact of vitamin C in relation to the cytokine activity associated with COVID-19 and found that vitamin C is effective in inhibiting the production of the cytokine storm. Again, vitamin C, this is something that we all know and love. We know about vitamin C but are we proactively taking advantage of this essential nutrient and are we doing it in the most efficacious manner, because synthetic forms of vitamin C, multiple studies have affirmed that it simply doesn't match up to the effectiveness of botanical whole food concentrates of vitamin C supplementation, and we want to go for the best forms of botanical vitamin C, not the 17th best. Gimme the best!

And the very best form of botanical vitamin C is going to be found in the Camu Camu berry, which is... A teaspoon of Camu Camu berry is about 700% of your RDA, vitamin C. It's not even comparable to anything else. The next highest source of vitamin C, botanical form of vitamin C that I love, that I've been utilizing for years, is the amla berry. So Camu Camu berry, number one, amla berry, and acerola cherry. These are the vitamin C powerhouses that I use, and I used to get them from multiple places, but now, I have them all together in the essential C complex from Paleovalley. It's one of my all-time favorite things. It's organic, no binders, no fillers, and whole-food concentrates of these powerful vitamin C-dense superfoods, which, at this time, more than any other, this is a time to definitely do something proactive to get our vitamin C needs met. Go to paleovalley.com/model, and you're going to get 15% off their Essential C Complex, also their incredible Turmeric Complex as well. Pop over there, check 'em out. It's paleovalley.com/model; that's P-A-L-E-O-V-A-L-L-E-Y.com/model. Again, you have 15% off everything they carry, including their incredible snacks. So, pop over there, check 'em out, ASAP, paleovalley.com/model. And now, let's get to the Apple Podcast review of the week.

ITUNES REVIEW: Another five-star review titled "Every episode is a must-listen", by jopa83. "I can't say enough good things about Shawn's podcasts. Every episode is a must listen and I'm learning so much. Real, useful, scientific information."

SHAWN STEVENSON: That's what it's all about. Thank you so much for leaving that review over on Apple Podcast, and I promise to keep it coming, starting with this episode today. Again, this is part two of a powerhouse conversation with one of the foremost experts in the human brain and overall human health. Our guest is Andrew Huberman, Ph.D., and he's a neuroscientist and tenured professor in the Department of Neurobiology at the Stanford University School of Medicine. He's made numerous important contributions to the fields of brain development, brain function, and neuroplasticity, which is the ability of our nervous system to rewire and learn new behaviors, skills, and cognitive functioning. Work from the Huberman Laboratory at Stanford University School of Medicine has been published in the top journals, including Nature, Signs, Cell, and has been featured in Time Magazine, the BBC, Scientific American, Discover, and much, much more. In this episode, again, this is part two of our conversation, we're going to talking about the neurobiology of obesity. We're going to be talking about the science around intermittent fasting, and that correlation with the human brain and overall performance and health. And also, we're going to dive in and talk a little bit about how stress and fear can impact the immune system, and what we can actually do to become more resilient right now. So, let's jump into this conversation, part two, with Dr. Andrew Huberman.

Well, speaking of food, there's also not eating food. And so, this goes back to one of the possibly most beneficial, nutritive approaches to stress. But this is putting our eating into a specific window, and as you mentioned, out of the Salk Institute. That's definitely where I've been really paying attention to; they're doing some great work there. Let's talk a little bit about that because this is another one of those things that we're going to eat anyways, but the way that we eat, it's not just what we eat, but it's the when, actually, that can make a huge difference.

DR. ANDREW HUBERMAN: Yeah, and here, I think... Again... A huge nod to Satchin. I've known Satchin Panda for a very long time. He's done terrific work in a number of areas of biology and neuroscience; wonderful guy. So, he's really the expert on this, but I've tracked this literature for a long time. And... The benefits of so-called time-restricted feeding, intermittent fasting are many. So, there is... Just to be crystal clear about one thing, because people sometimes get caught up on this idea of, is intermittent fasting the only way to lose weight or maintain weight, and of course, the answer is no. One... A person could eat from morning until night, calorie control, etcetera, and lose weight or maintain weight. That's clear too. The benefits of intermittent fasting, however, is that for many people... Not all people, but for many people, restricting their so-called feeding window, or the time during each 24-hour cycle in which they're ingesting food to about eight hours or so, does a number of things that are positive.

First of all, it's been shown that people can often adhere to that. They can stick to that much more easily than they can eating smaller portions. I'm one of these people. I can't eat half the croissant. I don't see croissants in halves. I only see croissants in wholes, and usually, I see two

or three, meaning I can't eat just half the croissant. I'm incapable of doing that. I just have never done it; I don't plan to, but I cannot eat the croissant, and then eat the croissant later. And many people find that that's more accessible to them. Satchin's lab and other labs have shown that even the same total amount of calories, limited to a certain period within each 24-hour cycle, actually can allow people to lose weight. Now, that's an interesting and kind of controversial statement, but... Ideally, people are eating healthy within that feeding window. So, we could talk about what eating healthy might look like.

But there's also... That when we start to fast, at first, it's painful. We don't want to do this. It's that stress and anxiety and friction, we have to override our reflex to reach for food, etcetera. But it also creates a really beautiful scenario, because the dopamine system, this reward system in our brain, is tied to when we actually... Not just indulge in things, but anticipation. If we know that we are going to start eating at noon, the food that we eat at noon actually tastes much better to us than the food that we didn't have to wait for. And we've all experienced this. If you've ever waited for food, or you couldn't eat, and then... Even the trivial food really tastes delicious. It resets... Recalibrates our sense of taste, so we tend to pursue less of these so-called highly palatable foods, or these foods that... Highly palatable sounds great. A delicious...

Highly palatable foods are foods often that have a lot of hidden sugars and other things that can disrupt metabolism, and... I know you're familiar with all this, but time-restricted feeding is a beautiful way to create harmony with eating and create harmony within the reward pathways, by which... We all need to eat sooner or later. So, it's pretty clear that the eight-hour feeding window is a good target. Eating windows that are much shorter, where... You know, some people do the one meal per day, only one meal per day, or six-hour feeding windows. A lot of people feel gastric distress, 'cause they're eating so much during that short feeding window. Some people might benefit from that, but it does seem like eight hours or 10 hours is a good thing to shoot for. Although I did learn recently that most people who are shooting for an eight-hour window actually are eating for a nine or 10-hour window; they don't... People don't track this quite as well as they think they do.

And then, there are additional benefits, which are... If you're eating at a pretty consistent time each day, your sleep tends to be better. And the general rules for fasting that I can observe from the literature are that you want to begin your feeding window at least one hour after you wake up; maybe longer, but at least one hour, and you want to end that feeding window at least two hours before you go to sleep. So, where you place it will depend. There's some evidence that eating breakfast and lunch and a little bit in the afternoon, and then stopping eating around 6:00 PM, provided you have protein early in the day, is more beneficial for muscle maintenance and muscle gain in men and women; that's been shown of various ages. There's some evidence that placing the feeding window later, starting to eat around noon, and then stopping to eat around eight or so, is better. That's probably a schedule... The noon to 8

is probably a little more compatible with most people and social schedules, 'cause you can usually just skip breakfast. People will let you get breakfast, but if you're the person skipping dinner while everyone else eats dinner... At least in our culture, it's not really socially compatible.

So, I've been doing intermittent fasting for a long time. I'm not super strict about it. I will occasionally have some almonds or something in the morning, but I generally start eating sometime around noon, and I try to stop eating sometime around eight, but it usually ends up being closer to nine. And I think that it's a great way to enhance your sleep. You then have very predictable periods of focus during the day as well. You'll start to notice you have a lot of focus early in the day, or you can predict when your periods of focus will happen, and that can be great for doing work, etcetera. So, I think they're just... And I could go on and on. I think there are a lot of blood sugar regulation benefits... Etcetera. But again, if you're eating far more calories than you're burning, then it's going to be impossible to lose weight or maintain weight. But... I think for most people, time-restricted feeding is a really great way to go about life. It also makes life less stressful, because you don't have to think about food for certain periods of the day, and you know when you're going to be eating, so...

SHAWN STEVENSON: Yeah, yeah. Do you do time-restricted feeding?

DR. ANDREW HUBERMAN: Of course.

SHAWN STEVENSON: So, this also makes you more resilient to stress, and to be able to be aware of that voice in your head, and... Here it is, 1:53 in the afternoon, as of this recording. All I've had today was my Four Sigmatic coffee. So much earlier, and...

DR. ANDREW HUBERMAN: I confess, I had something this morning after my ... but, yeah...

SHAWN STEVENSON: So, this is a great thing about it too, is like, some days, I throw in these longer fasting periods, for, whereas most days, I'll probably eat around 10 or 11 for myself. But I've been doing this for... I don't even know how long; maybe nine years. And...

DR. ANDREW HUBERMAN: Oh, that's great. Where did you first learn about it, 'cause Satchin's work goes back to about 2010... And of course, I should acknowledge people have been doing time-researched feeding for centuries; this is not something that was discovered at the Salk Institute, but the science and the benefits... One, in particular, the benefits on liver health have been really impressive. That is something that is only recently known, but where did you initially hear about it?

SHAWN STEVENSON: Now, I remember it was eight years, and it was Ori Hofmekler. Ori Hofmekler.

DR. ANDREW HUBERMAN: He's... I'm so glad you mentioned him. Israeli Special Forces, guys.

SHAWN STEVENSON: That's right.

DR. ANDREW HUBERMAN: I know Ori. He... I'm so glad you mentioned him. He really deserves credit for the Warrior Diet.

SHAWN STEVENSON: That's right, exactly.

DR. ANDREW HUBERMAN: He deserves credit for being one of the first people I've ever heard... He said, this thing that you have to eat six meals a day, or three meals a day, he said that's crazy. When he was in Israeli Special Forces, they were eating one time a day. And I think he's... Ori's got to be in... Sorry, Ori, if you're younger than this, but he's got to be in his 60s, and he is in amazing shape.

SHAWN STEVENSON: Yes, exactly. That's his thing for me, even when I first picked up the tool was... I'm a very big proponent of results, and so, just like, "Oh, this guy is at this level in life, and just look at him and his cognitive ability, like... He's really onto something." Of course, when he's putting these ideas out, they sound very, very sketchy, you know?

DR. ANDREW HUBERMAN: Oh. I briefed Ori Hofmekler... I wrote to him years ago and said, "I think your book is fantastic. I want to come talk to you," so I drove out to his house in Temecula, and we sat there, and... He's also an animal lover, which I am too. I'm not a vegan, I confess, but I do love animals. And he had French bulldogs, he had a little pig running around, he had all these... He had so much stuff going on there. And he told me about this compound called berberine, which is a tree bark that can lower blood glucose. Now, I don't take berberine, personally. It's just not... It's not for me, just... But... Nowadays, there's all this talk about metformin, for lowering blood glucose. Berberine and metformin are basically identical in function, and he was telling me, "You know, there's this tree bark, berberine," and I thought, "This is pretty weird." Basically, everything he told me that day... Time-restricted feeding, berberine... He was also talking about cold water exposure. He was talking about a number of other things related to high-intensity training. Everything he told me that day is now showing up in the hardcore scientific literature and is all over social media. So, Ori... If there were a prize that one could give for this sort of thing, he would definitely deserve it.

SHAWN STEVENSON: That's powerful, yeah. Even in my latest book, in Eat Smarter, I mentioned stress-mimicking nutrients. I picked that up from Ori, yeah, so... Just... It's so cool, and I love this

that today, we are able to validate these ideas, but we also have to pay attention to these anecdotal things too, and seeing the effectiveness, and not to mention Ori's... His accent, as well, is pretty cool. So, we'll put Ori's episode... I interviewed him probably...

DR. ANDREW HUBERMAN: Oh, did you?

SHAWN STEVENSON: Probably six years ago, maybe five years ago?

DR. ANDREW HUBERMAN: I need to reach back to him. I... Such a wealth of knowledge. And I agree; I think... One of the big... Ori does not fall into the camp I'm about to describe, but one of the major mistakes that we've made as a species is that we tend to shroud things in language. We tend to talk about things in... Not you, obviously. You're doing an amazing job of clarifying and getting the message out there to people about health. But there's this problem within... I'll just say it; there's this problem in the yoga community, which is the same one which is in the community I'm most closely associated with, which is the scientific community, which is that the language confuses everybody, and it acts as a distancing agent as opposed to a connecting agent. And so, I have great respect for the yogic practices, and... Which, of course, go back thousands of years, as I have great respect for the scientific method and practices, but what they share in common, which is not so good for humanity, is that the names of things make it entirely impossible to understand what those things are about. So, a big part of what my life is about is trying to look to these different people and practices, acknowledge the value of what they're doing...

I'm not interested in washing out the traditions. That's not my goal. My goal is to try and bring a bit of mechanism alongside that, so that people that wouldn't naturally gravitate towards these things might think, "Oh, well, sunlight viewing, is this sun gazing?" There are even these people, they call them sun eaters or something like that. Anyway, we can't eat the sun.

But viewing sunlight is very powerful and useful. And we have melanopsin cells and suprachiasmatic nuclei. And so, when you start to layer in the different practices with the underlying scientific mechanism, and then hopefully make it clear and accessible to people, you start to realize this, we're all talking about the same things. And more importantly, we all want the same things. We are all trying to be able to deal with stress. No one wants to be so calm that they never experience any stress, that we can cope well, that we're gritty and resilient, but that we're emotionally flexible.

And I think people like Ori are... I think they are really early pioneers that really do deserve the credit, or a certain amount of the credit really, for raising the flag and saying, "Hey, there's no rule that says you have to eat all day long. In fact, eating for shorter periods of time each day can have tremendous health benefits." And they embody the practices. Like you said, you see

them and you're like, "He's on to something." Many of my colleagues, scientific colleagues, do time-restricted feeding. I've got colleagues that were finally able to lose weight despite many, many years of challenge because they use time-restricted feeding. And again, there are other modes of nutrition that can work, too. There's no debate about that. Everyone agrees, there are other modes as well. But for some people, it's really been a lifesaver for them.

SHAWN STEVENSON: And you just mentioned it, there's a lot of in-fighting because of language. And for me, it goes back to this quote attributed to Einstein, that "If you can't explain it simply, you don't know it well enough." So just striving to put that to the side, I think a big problem is people trying to sound smart or trying unintentionally sometimes to over-complicate things so that you're the oracle of this bit of data versus like "Let's help people and have much more intersection of things than... " Even these different diet frameworks that are incredibly valuable, people aren't... They're not promoting a particular diet framework because they want to be a jerk or to hurt people. They're probably seeing results with their patients or the people that they're working with, whatever the case might be. And there's so much overlap with all of these different frameworks, but people get caught up in the language, or they get caught up in the minutiae. You know what I mean?

DR. ANDREW HUBERMAN: Well, I would say the more closely somebody is tied to just one practice or protocol, the more rigid they're going to be about that because that's their one thing. It's like a dog at the dog park and they got the one toy at the dog park. There's more than plenty to go around, and I think that one of the most important things in my mind is to really understand What are the negotiables and the non-negotiables in terms of health practices. We all need to get good sleep. That's a non-negotiable thing. We all need time to perfect that process. We may probably never even perfect it. But then there are the negotiables. And I would say in terms of time-restricted feeding, what's the best feeding window, how long, and at what time of day? The one you can stick to consistently. And when I say consistently, I mean 80% of the time.

And we actually know that. There are now data that show that if you do that eight-hour feeding window early in the day, one day, and then late in the day the next, that actually isn't as good for you as if you place it consistently early in the day, most of the time. What happens then is all those genes, those clock chains that regulate different functions of your liver, your gut, your brain, those genes actually start to fall into a really nice rhythm. When you're moving that feeding rhythm window, excuse me, around a lot, then the clock genes get disrupted, too. You actually are jet-lagging yourself while you're at home. You're not traveling, but your body thinks you're in New York one day, and then you're in Los Angeles the next.

So, I think it's "What can you do consistently?" And for some people, they might say, "Well, the number of times I can get into a cold shower each week or do just breathing is zero." Well,

that's where I would kind of lean... I'd turn that around and say, well, it's because there's so much resistance to it that you actually stand to gain the most from it, even through just a small step in that direction.

SHAWN STEVENSON: I love that. So, the answer to what's the best feeding window is the one that you'll stick to, the one that you actually do.

DR. ANDREW HUBERMAN: The one that you can stick to 80% of the time.

SHAWN STEVENSON: It's the same thing with exercise. People ask, "What's the best form of exercise?" The one you'll do. The exercise that you'll actually do is the best form.

DR. ANDREW HUBERMAN: And over time, I think... I'm sure you can attest to this, that over... That will change over time. So, the one that you can do for the next six months, but at the end of that six months, you may find you have a greater capacity to do more or less or change the form of exercise. The decision to do any one of these things or all of them is not a decision that you're going to do this for the rest of your life. You might, that would be wonderful. I hope that you at least get the sunlight viewing for the rest of your life. But we all go through dips, and valleys, and peaks of doing everything correctly. We're all human.

SHAWN STEVENSON: Right, right. This is a true story as of this recording, just yesterday, and I love this. I'm bringing this up because you said that this practice can actually make food taste better, which sounds crazy. But my youngest son, Braden, he's 10 years old, yesterday he wanted to fast. He's been saying, he's like, "Tuesday, I'm going too fast." So, he said this last week, and I was like...

DR. ANDREW HUBERMAN: He just decided this?

SHAWN STEVENSON: Yeah, and then my brain is like, "I don't know his got stuff going on, I don't know if this is appropriate." But he's been semi-intermittent fasting for quite some time. Whenever he's not going off to a class, it's kind of external. So, he's pretty well-versed and just being comfortable in not eating something, especially first thing in the morning. So yesterday, Tuesday, he did his fast. We gave him some fresh-pressed juice, he had some soup, those kinds of things. And I made some food for myself in the morning, and I was walking to my office, and he was just asking questions about my food. He's like, "Oh, this smells so good." And I was like, what is your brain telling you right now? He's like, I really want to eat that.

And I was like... And I asked him, "So what does your brain tell you if you can't have it?" "Well, then it's I'm just going to go crazy." And I was like, "Is that actually true? Are you going to go crazy if you don't eat right now?" He's like, "No, it's not crazy. Yeah, it's not true, it's not true.

I'm not going to go crazy." And so, I was walking him through that voice that comes up in his head. And so anyway, so he went through the day, he successfully completed his little fast day. And this morning when my wife was making his breakfast, he was like so lit up to eat. He was like, "The smells... " and he was describing it.

DR. ANDREW HUBERMAN: He's in touch with it, yeah.

SHAWN STEVENSON: And once he ate his breakfast today, he was like, "This is the best food I've ever had." It's the same thing he eats all the time, but his connection to it, his value... Actually, I think that we become a little bit inundated by the consistency that we have with food today.

DR. ANDREW HUBERMAN: Absolutely.

SHAWN STEVENSON: So being able to take a step back, and to really bring ourselves into a place where we're more present, and to enjoy the experience, because it really is such an awesome part of life, is eating. What if we had a tool that we can have more of these joyful experiences and get more? And probably, we're going to have more satisfaction mentally by interacting with maybe some of our satiety hormones, for example.

Absolutely. Now, I love that story. I think that the dopamine system is just such an incredible system because it causes the seeking and this craving. It's really a molecule of craving. It's actually a cool experiment that illustrates this, that this was done in rats, but it's also true in humans, it turns out. Equivalent experiments have been done. Take two rats, put them near a lever press where they can get a really delicious food for a rat. And they'll lever press, and they'll just eat and eat and eat. If you remove all the dopamine neurons or in a human if you block the ability for dopamine to function, people or rats will still lever press to eat, and humans will still eat. You can still experience pleasure without dopamine. But if you take that rat, and you move it just one rat length away from the lever press, what you find is the one without dopamine won't even cross the cage to press the lever. So, dopamine is really about the motivation to seek pleasure.

Now, intermittent fasting is interesting because it does two things. It creates a heightened motivation. Your son was saying, "I really, really want to eat," so the motivation is there. But then when you finally achieve it, when you do eat, you actually get dopamine release from that event. Now, the equivalent stuff in humans or points to the fact that if we do something that we enjoy and we do it over and over again, we really do get less enjoyment from it over time. So, this goes back to what we were talking about earlier about the phones, but... So, if we enjoy something, person, place thing, activity, anything, taking some space from that will allow us to achieve more pleasure with it over time.

I think about this sometimes in terms of human relationships now. It used to be when you say goodbye to somebody, you weren't talking unless you got on a phone call. Now, you're texting all the time. And a very wise person once told me, "It's okay to miss each other." And this is something that I think is missing from what we are all expected to be in communication all the time. And that's beautiful, too. You can share pictures; you can share experiences all the time. But we also know that relationships of any kind, to food, to other human beings, those are challenged by too much. It's not really connection. It's too much communication, but it's not really connection.

So too much eating, but you're not getting the joy from the food. So, you're eating, but you're not actually experiencing the food in its full pleasure or what it could do for you. Same thing with constant communication with somebody that you really care about. You think about it is we're so close, but actually, in some ways, you're making yourself chemically more distant.

Taking some time, it doesn't have to be extended periods of time... And I'm not trying to shatter any relationships here, I'm actually trying to reinforce them, believe it or not. But taking some time where you're not in communication, and then it actually feels like a really potent thing when it comes in. That's because dopamine is the universal signature of craving and reward, whether or not it's for relationship, whether or not it's for food, whether or not it's for friendship, these... In fact, we've heard of oxytocin, this bonding hormone. These are new data, not from my lab, but the oxytocin system and the dopamine system are linked. Social connection is very rewarding. It releases dopamine.

And right now, people have been really separated, so I don't want to encourage more separation. But hopefully, as we move forward through everything that's been happening, as we start to re-establish direct contact, people are going to start to feel more connected. I just saw my mother for the first time in a year, and it was a really wonderful experience because we haven't seen each other in a year, and that's unusual. And so, you can get more out of the same experiences over time, by just having some self-control over the kind of reflexive need to constantly push things back and forth. And of course, I realize maybe I'm just also trying to get people out of the need to constantly text back. It's okay if people don't text back right away. When they do, it'll feel that much better.

SHAWN STEVENSON: Awesome. Do you remember there was actually a time when you can leave your house, and you couldn't reach the person until they came back? Do you remember this time?

DR. ANDREW HUBERMAN: I do. I'm old enough to remember. It felt like another life ago, but yes.

SHAWN STEVENSON: Yeah, there was a time when people could actually leave, and then... And also, the same thing with if you were dropping by to see somebody. Whereas today, it's just like, "You better text me when you're outside, kind of thing. Don't just knock on my door." It used to be a pleasant surprise when somebody stops by like, "Yay, it's the Joneses. Hey, how you guys doing?" Today, if somebody even knocks on your door, you're like "Who the hell is that?"

DR. ANDREW HUBERMAN: Yeah, exactly.

SHAWN STEVENSON: You know what I mean?

DR. ANDREW HUBERMAN: Yeah, sure do.

SHAWN STEVENSON: We've kind of devolved in a sense with this, but then we have technologies made us more connected in another sense. So, this is all powerful stuff, and just bringing up this conversation with our modalities of eating, we've got to talk about the elephant in the room, which is here in the United States, we're the most obese nation really in the history of humanity, which is not a great award to be getting. And I want to talk about this because I think, unfortunately, we tend to point fingers at the individual and not at the systems, and also negating the fact that there are some profound changes that happen in the brain when we venture into the state of being overweight or obese. So, let's talk a little bit about that.

DR. ANDREW HUBERMAN: Yeah. So, I'm glad you brought up pointing to the system and not to the individual. There are things that clearly are happening at the level of the food itself that 10 years ago, if you talked about hidden sugars and chemical emulsifiers, you sounded like some health food nut, basically. But now, we can look to some of the most prestigious scientists and physicians around the world. A good example is Dr. Robert Lustig. He's a pediatric endocrinologist at the University of California, San Francisco. And he's talked about how the fact that making foods more tasty is one way to get people to buy more of them and eat them. And obviously good tasting food, excellent tasting food is wonderful. Most people aren't cooking for themselves whole foods as much anymore.

This is a big shift, right eating processed foods, etcetera. It is problematic. Why? Well, now we can really understand some of the data. We have dopamine neurons in our brain that drive us to pursue more of whatever caused the dopamine release. It turns out we also have neurons in our gut. This is work by a guy named Diego Bohorquez at Duke University. These are neurons in our stomach that send connections to our brain. This is the so-called gut-brain axis. This is

independent for the moment of the gut microbiome. These are just neurons in our gut that send connections to our brain. And these neurons sense sugar, fat, and amino acids.

Now, amino acids are actually quite good for us. They come from various forms of protein, animal and vegetable proteins. They are the building blocks of protein synthesis, and they're very important to life. They are essential. We also need essential fatty acids. So, in reality, and I'm not low-carb myself or anti-carb, but there's no such thing as an essential carbohydrate. There's essential... You need proteins, you need fats, and if you use carbohydrates if you need carbohydrates as a fuel. These neurons respond, however, also to sugar. And when we eat sugars, even if we can't taste them, what their group has shown, their lab has shown, is that these neurons become active and trigger our brain to seek out more of whatever food we are eating, independent of the taste.

So, the simple way to put this is, you think that you're eating these chips, and these snack foods, and these other highly palatable foods because they taste good. But you're actually eating them because your brain is craving the dopamine release in a subconscious way. So, your nervous system is literally being tricked into pursuing more of these things, and it actually has a lot less to do with taste than you think. Now, the other problem with these really calorie-dense, highly palatable foods, is that they make more bland foods taste really bland, at least for a while.

And there's a nice literature related to this. There's a woman at Yale University named Dana Small, whose lab has looked at how flavors and desire for foods map on to one another. It's an extensive literature, but the long and short of it is that if you start to eat foods that are a little bit simpler, it doesn't mean you can't flavor your food, but a little bit simpler that aren't so intense with so many flavors, then those foods take on the property of causing dopamine release, just like the really highly palatable foods.

So, there are hidden sugars that are driving more eating and over-eating. There are these emulsifiers. And those actually, the chemical emulsifiers have been shown to disrupt the gut microbiome. The gut microbiome, we have a lot of species of little microbes living in our gut, which sounds gross, but they actually, if they are the right ones, they really help us, so much so that people who are obese versus people that are lean, if they swap their microbiota, they actually can do this, they can swap which sorts of little microbiota are living in the gut, then people who are heavy, get lean. And they tend to crave healthier foods. So, this is really interesting, and what it shows is that the gut is talking to the brain, in a way that is below our conscious detection. I know that sounds crazy, but there's tons of data to support this.

Now, one of the things that's very actionable, that work at Stanford in the Sonenberg Lab has been shown to benefit this whole system, is to keep a healthy gut microbiome. And the best

way to do that turns out is not to take probiotics, which by the way are very expensive and often have the wrong species of probiotic and the wrong bacteria, but rather to eat two to four servings of low sugar fermented food per day, so sauerkraut, pickles, not the ones loaded with sugar, but natto, kimchi. These are foods that throughout history have been used for various health benefits, so they tend to lower inflammation. This has now been well established, lower inflammation, which is good for the brain and body. They can promote healthier eating. They can promote a healthier dopamine system, so to speak, that leads people to pursue healthier foods.

So obviously, people are over-eating, but part of the reason they're over-eating is not even their own bad conscious choices. It's that their brain has been tricked into overeating. And so, I think there's the physical exercise component, of course. But I think that we need to acknowledge that the system... And now, I really sound like... the system with respect to processed foods is definitely rigged. And there's a whole thing around this that makes financial sense for...

And I don't think conspiracy here, it's when foods can spoil on the shelf, they can't be listed as a commodity. And so, there's a huge financial upside for being able to create foods that can have a long shelf-life and that are therefore loaded with emulsifiers and disrupt the gut microbiome. There's a huge incentive for putting so-called hidden sugars into foods, even hidden false sugars like saccharine into foods, not to lower the caloric count, but because that actually can trigger these mechanisms, these bad mechanisms, too. So, I think we need to acknowledge that the number one thing that all of us can do is create a healthy gut microbiome... Well, there are three things. One is recognize that there are these subconscious things; that what you think you're eating, it might not actually be what you're eating, and that it's changing your appetite. So that raises the second thing, which is most people should probably try and eat whole foods. So, if you... Even foods that you prepare. And non-processed foods. And then the other one is basically to create a healthy gut microbiome through the ingestion of two to four servings of fermented foods.

Which isn't much, it's a few spoonful's of sauerkraut, or a pickle, once or twice a day. Most of these foods are pretty tasty anyway, but most of us aren't consuming enough of those foods. And, of course, there's the whole fiber discussion, which is kind of a controversial discussion, so I'll leave that out. But your gut is part of your nervous system, and it's telling your brain what you should pursue more of. So, some of us are a little bit like robots with food. And I experienced this, I confess I love chips and I'll start and then, at some point, I'm not even tasting them, I'm just chucking them down my throat. And I'm like, what is going on here? And that mechanism has been kicked on. And it's the same way a gambling addict would be gambling without any concern for the outcome. We always think about the gambling addict, or the chip-eater, thinking, oh, these are so delicious, or I'm going to get the big win.

The gambling addict is actually in a reflex mode. They're just trying to hang in there and not suffer. And so that's why when we withdraw these things, at first, we feel miserable when we stop eating these highly palatable foods. This is work that's been done by my colleague, Anna Lembke at Stanford on addiction of any kind; we feel miserable, we think life is just terrible, people actually start to feel kind of depressed. But then slowly over time, that capacity to get dopamine from simpler whole foods starts to return. So, it's the same process as we saw and we're talking about for the phone.

DR. ANDREW HUBERMAN: So anyway, sorry again for the monologue, but that's...

SHAWN STEVENSON: No, this is fantastic. Yeah.

DR. ANDREW HUBERMAN: But I think once people realize that you got these chemicals and they're being controlled by external things, but you can take control of them, then I think it opens up a whole other avenue that isn't... All the same, things still apply, 150 to 180 minutes of exercise, eat whole foods, but somehow in my fantasy version of this, by understanding that the way you feel makes sense given what you've been doing, and the way you're going to feel better makes sense if you do the following things, I like to think it provides some relief to people, that it's not always going to be a grind. That's the idea.

SHAWN STEVENSON: Yeah, it's very simple. So, I think a lot of things got gummed up when scientists figured out how to isolate flavors...

DR. ANDREW HUBERMAN: Oh yeah.

SHAWN STEVENSON: Gas chromatograph, and being able to take these...

DR. ANDREW HUBERMAN: I apologize on behalf of the scientific community. We mean well, it's just sometimes industry picks up on it and that's it.

SHAWN STEVENSON: Yeah, that's where it goes...

DR. ANDREW HUBERMAN: 'Cause most of us don't have companies or anything, some do but most are just... Scientists are nerds, we're just trying to figure out... We just want to figure out how things work.

SHAWN STEVENSON: And then marketers tend to screw things up and...

DR. ANDREW HUBERMAN: That too.

SHAWN STEVENSON: That bottom line. But taking... Basically being able to make things taste like other things, and kind of muddying up the waters of that brain-body connection...

DR. ANDREW HUBERMAN: I knew we were in trouble when we started merging Thai food with pizza.

I'm serious. I remember thinking, what is going on? It was like... Or that chips suddenly need... Like growing up, I ate my fair share of Doritos, okay, I did. Nowadays I don't eat that kind of stuff, but I did. But then it was like the number of flavors that they were packing into this thing, and then it basically became like a Styrofoam delivery system for intense flavor of all kinds. And the problem is not that... There's nothing bad about it, per se, it's that it's shifting your nervous system so that other things don't taste good, and so that that becomes the only thing that's going to do it for you. And I always say addiction is a progressive narrowing of the things that bring you pleasure. And that can be extreme, like drug addiction and heroin addiction, but we have these little micro-addictions, and we think we need something when actually we just taught...

We accidentally taught our nervous system that this is the stimulus for dopamine. And it's terrible, and we really should relieve ourselves of some of the blame. And there's no one company to point to, it's just humans stumbling over the process of being human, is really what it is.

SHAWN STEVENSON: Yeah. Yeah. So, I loved, also, you gave a simple tactic, which is, so we know we've got this flavor explosion available, then let's get back to something to kind of buffer that, is just, Let's eat a very simple food without all the dressing up, and just eat that actual food maybe one or two times a day. Have a just a regular actual food. Don't try to not eat the Doritos, the jumbo bag, bacon, chili, Dorito flavor, whatever, and just eat a carrot. Just see what that experience is like. Give your system that kind of input. And also, there was some great work done, and I love that... We talked about this before we got started. Wim Hof; I had no idea that he had a twin, which is nuts, and I was immediately like, I want to study these two to see the differences. And one of the things that I came across a couple of years ago, is still pretty recent data, is a study that was being accumulated on twins.

It was like the biggest database of twins, to see what's happening with, identical twins specifically, differences in their microbiome, to see what the different outcomes would be as far as obesity. And they pinned down that changes in their microbiome from one twin to the next, a twin having this cascade of bacteria associated with insulin resistance, diabetes, and the other twin having this "lean" cascaded bacteria, and seeing this consistent pattern that one twin would gain weight while the other didn't eating the same diet, essentially, living in

the same household. That's the power that these microbes have. So, you bringing that up and talking about that association is incredibly important. This is one of the things we want to try to address because these microbes do have something to say about whether or not we're going to be obese.

DR. ANDREW HUBERMAN: They do. And I think that the two to four servings of fermented food per day, I think... One reason I like that recommendation is the signs point to it as beneficial, and also, it's something to do as opposed to something to not do. There's a lot of restrictive practices that are associated with losing weight, etcetera, and those are hard because they're restrictive, but the addition of something that hopefully, I think most people like some form of fermented, low-sugar fermented food. The gut microbiome is so fascinating, and it's an area that you can just think of, part of you, it's like a little community that talks to the neurons that talk to your brain and really control your appetite. Some people start eating fermented foods and they lose their appetite for really sugary carbohydrate type foods; they just lose it completely. They just, for whatever reason, they don't crave that stuff anymore. And it's remarkable, but it makes sense. And the microbiome is involved in so many things. I think it's... Sleep being the fundamental layer of health and all the light and stuff that goes with it, but I think that the gut microbiome is right up there in the top five or so of critical aspects of our body that we all absolutely need to take care of.

SHAWN STEVENSON: Yeah. I love that. So, adding some fermented foods. Another thing seen in the data is simply increasing the variety of foods that you're eating. That's another simple intervention that we can do. Because if you think about it, every food that we eat has its own microbiome in a sense. If we eat a blueberry we're eating that blueberry's microbiome, if we eat an avocado, we're eating that avocado's microbiome. And so, because I think that we have this tendency, and I know that I did earlier on in my career in looking at, again, probiotics, and even prebiotics, and I think that creates tunnel vision, where we might go to Google and find that Here's the best prebiotic foods. Really, every food functions as a food for something else, for some form of microbes, and so we know clearly now that having a diversity can help to fortify the diversity of your microbes. As your diversity goes down, your risk of diabetes goes up, your risk of obesity goes up, sleep problems, etcetera. So, super simple stuff. Again, we don't have to try to stop doing everything but just add in a little bit more variety.

DR. ANDREW HUBERMAN: There's even some evidence that... And this is wild, and it's just one study, but my friend, Andy Galpin, he's a physiologist and professor at Cal State Long Beach, he's a really skilled muscle physiologist, and he also does the training side, so he knows the stuff under the microscope really well, and he knows the actual practices, that a disrupted microbiome can actually prevent the adaptive responses to exercise. Which is wild. Same caloric intake, same exercise, its resistance exercise, in this case; the muscle adaptation does not take place in cases of what are called dysbiosis, where they're not getting enough...

SHAWN STEVENSON: That's nuts.

DR. ANDREW HUBERMAN: Variety in the gut microbiome. So, the gut microbiome is foundational. I think that we can talk about it in the context, it's been shown to improve symptoms of autism. There's just so many things. Cognitive function. It just, it's a fundamental layer. I would say sleep is the fundamental layer, and then gut microbiome is right there in the foundation. And, you know, if you want to use the house analogy, or building analogy if the foundation is shaky, nothing else is going to work well, everything else is going to seem harder; the electrical is going to go out, it's just unstable. So, sleep and microbiome are two of the major pillars. They're not the only pillars, but they're two of the major pillars. And what's cool about getting good sleep and taking some control of the microbiome is it makes the other stuff that we're told to do easier, like making the choice to exercise, making the choice to make better food choices, making the choice to have some self-control with respect to the phone use, etcetera.

So, it sets a foundation, and that's why I like these foundational health practices because we've heard a lot over the years of, "Do this one thing", and it does indeed work, but for people that have a hard time leaning in that direction, it's like, Ah, the door shuts immediately. But it's a pretty amazing thing when you start to see or interact with people that for the first time in their life, they're getting good sleep consistently.

SHAWN STEVENSON: Got a quick break coming up, we'll be right back. Snuggle up with some fat-burning nutrition this holiday season. You know what time of year it is, it's that time to get cozy, it's that time to snuggle up, it's that time for a nice pumpkin spice everything. But truly, some of the most potent nutrition can be found right in our spice cabinet, and this particular spice that you need to know about has been used traditionally in cooking, medicine, and rituals for thousands of years. And what I'm talking about is turmeric. Turmeric is one of its most renowned micronutrients, curcumin, have well-noted anti-inflammatory effects, but what isn't commonly known is its surprising anti-obesity effects. A study published in the European Journal of Nutrition covered that, in addition to down-regulating inflammatory cytokines, curcumin in turmeric also up-regulates the activity of adiponectin and other cytoity-related hormones. Turmeric has been found to actually improve insulin sensitivity, reduce blood fats, and directly act upon fat cells.

Another really interesting thing about turmeric is that it has anti-angiogenesis properties. A study published in the Journal of Nutrition found that curcumin in turmeric is able to reduce angiogenesis in adipose tissue, which is fat tissue, and angiogenesis is the process of decreasing the blood supply, nutrient supply, to those pesky fat cells, and also to cancer cells as well. And turmeric has been found to have an intelligent selective capacity to target rogue

cells and reduce their ability to grow. Really, really fascinating stuff, and it's one of my favorite things that's in the gold blend from Organifi. This blend highlights a supercritical extract of organic turmeric plus other metabolism-enhancing spices like cinnamon and ginger. It also has rishi, which is clinically proven to support your sleep quality. It's a grade vibe, a great way to relax, and a great time to enjoy the season. Head over check them out. It's organifi.com/model. That's O-R-G-A-N-I-F-I.com/model for 20% off your gold latte. Check it out.

Another thing I want to ask you about is neuro-inflammation. Inflammation taking place in the brain. There was some research out of Albert Einstein College of Medicine, and they were looking at this connection between inflammation in the brain and obesity, finding that test subjects tended to have higher rates of body fat when they had more brain inflammation. And on the other side, it's kind of a vicious circle, more body fat led to more inflammation in the brain. And so, I think this is an overlooked issue as far as, again, how do we actually "heal a metabolism" when people are fighting these battles and not maybe considering maybe our lifestyle, the things we might be consuming, might be creating inflammation not only in our bodies but in our brain as well.

DR. ANDREW HUBERMAN: Yeah, brain inflammation is really interesting, and nowadays we hear a lot about inflammation. The brain, as we discussed earlier, is a unique organ, for a variety of reasons, it can change itself, etcetera, it's kind of our master computer, if you will. But the other thing that's really unique about the brain is it doesn't have any pain receptors. So unlike inflammation in our body, which feels painful, like, my knee's inflamed or my skin's inflamed, or you have an ingrown hair, and it feels inflamed, you can feel it, when your brain is inflamed there's no sensation of inflammation. That wasn't meant to rhyme but it does. So, brain, no sensation of inflammation. Terrible. I'm a scientist, I'm allowed to make bad jokes. So, there are a couple of things that are important. One, it takes us back to sleep. So, one of the amazing discoveries in the last five years is the so-called glymphatic system. So, we have lymph, which is a system in our body that moves around immune cells and other cells in response to infection. If you've ever had swollen lymph nodes, that you have lymph nodes everywhere, in the groin, the armpits, around the neck, etcetera.

Behind the years. But we also have a lymph system in our brain, it's called the glymphatic system, 'cause we have these cells called glial cells, so the G is for glymph. And it turns out that during deep sleep the glymphatic system becomes very active and there's literally a washing through of lymph-like fluid, especially in this little channel, like a little stream that exists between the brain and the skull, but also within the brain, and it's washing out debris and reducing inflammation. So, all day long, whether or not we have a head injury or not, hopefully not, but whether or not we're just doing our normal activities or something very intense, there's debris. Neurons are very active nerve cells, among the most active nerve cells in our body, excuse me, and they generate debris. And so, the garbage needs to be taken out.

And the glymphatic system is this sweeping out of the garbage each night, that if we don't do our brain starts experiencing inflammation. Now, inflammation in the brain does not mean that the brain is swelling. I think we get this, like, the brain is swelling. No, it's actually the expression of these what are called inflammatory cytokines. And for those of you that are interested in this and are interested in inflammation in the body as well, these inflammatory cytokines come in a lot of varieties, but they tend to have a few names that you'll hear consistently.

Excuse me. IL-6, interleukin 6, tumor necrosis factor-alpha; those are the main ones. Well, you can reduce levels of IL-6 in the brain, reduce inflammation, make neurons more stable and healthier over time by making sure that the glymphatic system is active. So that means getting regular deep sleep. And one of the best ways to really mess up your brain and your thinking is to not get deep sleep consistently or get enough of it. Now, I don't want to alarm people that aren't getting that and are trying, but it's really vital that you figure out how much sleep you need in order to be functional during the day. A good definition for insomnia that's actually a clinical definition is, if you're falling asleep during the day, you're probably not getting enough deep sleep. Now, this brings me to the other issue because you were talking about specifically obesity and inflammation in the brain. One of the major blockades to deep sleep is sleep apnea; people fall asleep and they're breathing, obviously, and every once in a while, because carbon dioxide, that we talked about before, levels go up in the body, oxygen levels are dropping, carbon-dioxide levels are going up, and then people are periodically waking up in order to grab more oxygen. Because when carbon dioxide levels get high, it triggers the gasp reflex.

Sometimes this is conscious, and we wake up a lot. Most of the time people don't realize that they are going in and out of sleep all night and they never get into that deep sleep. So now it's a two-pronged problem, on the one hand... So, they're heavy so they're not breathing properly. Now, sometimes this can also be caused by just obstruction. It can even be caused, believe it or not, by if you sleep with your pillow and your head forward like you're texting all the time, but in your sleep, you can obstruct the airways and you're getting apnea, and you're not getting deep sleep, you're not getting glymphatic wash-out, the brain is becoming inflamed. There's very clear evidence to support that. Another one is people are becoming mouth-breathers, and it's not just people that are obese, it's all people are becoming mouth-breathers. Some of this has to do with the foods we're eating, some of it has to do with propping our head up on pillows, some of it is related to other factors. But unless one is speaking or eating, we should be breathing through our nose.

Now, when we exercise, it's different. Exercise, you can nose breathe, but as you start to exert yourself more there's a tendency to mouth-breathing, that's fine; there are opinions about this, but in general, it's fine. But by breathing through the nose more consistently, something

that we can all do, it changes the shape of the airways, the sinuses dilate. A lot of people think they have deviated septum, when in fact they're just not breathing through their nose enough.

James Nestor's book, Breath the new science of lost art have...covers this. The was a book from my colleagues at Stanford that was prior to that, called "JAWS" is a hidden epidemic. Breathing through the nose, believe it or not, allows the nasal passages to dilate, prevent sleep apnea can help with the glymphatic washout, reduce inflammation, and this is true but in all people. Now, the other thing this takes us to is breathing, so for some people who are challenged, they're overweight or they're challenged with obesity, and they are trying to embark on a system of weight loss, breathing protocols are actually a wonderful entry point to that, and they're not a substitute for exercise, but as we talked about earlier, because you can do them anywhere, they teach you how to breathe through your nose. So, some people will do a breathing practice, like a 10-minute a day deep breathing practice. There's studies on this now.

Purely through the nose, and at first, it feels kind of restrictive, but actually over time it becomes easier to breathe through the nose, then during sleep, they're breathing better, some people will tape to their mouth shut, that seems kind of dramatic, but I know people that are just putting some light medical tape over their mouth, so you're not going to suffocate.

SHAWN STEVENSON: Some people said it's a game-changer for them.

DR. ANDREW HUBERMAN: Game-changer, some people will fall asleep holding their mouth shut, and I don't know how long that lasts, but shifting towards being a nasal breather is clearly a good thing to do. Also, the number of infections that people get is vastly reduced when they're mostly breathing through their noses. So, a different colleague of mine at Stanford did a study of basically shutting the nasal airways or shutting the mouth most of the time, unless people are speaking or eating when people are breathing through their mouth, they're susceptible to far more infections. It's a... We have a lot of things in our nose, along the mucosal lining of our nose that serves it, it literally scrubs or kills bacteria and viruses better than breathing through the mouth. So, you can't over-emphasize the role of good breathing, but... Yeah, so for people that have sleep apnea, a lot of people get the CPAP and they'll get this device, okay, if there's a medical need for that, but that's another example of treating the symptom, not really getting to the root cause. So, I think we are going to start hearing more and more about this in years to come, so people should become nose breathers most of the time, get your sleep right, that will reduce brain inflammation.

Obviously, that 150 to 180 minutes a week of cardiovascular exercise is going to be easier for somebody that's accustomed to breathing hard. I have a friend who is a former special operation military, and he always just says, "Look, the rule is very simple to getting healthy and staying healthy, breathe hard for an hour a day." And I was like, "Does that mean I can just sit

in the chair and breathe hard?" He was like "You could, but it's easiest to do that by walking or running or doing some sort of work." And when you think about it, that's a significant amount of breathing hard per day, and that's just the breathing you're doing during exercise, how you're getting your hard breathing outside of exercise, that's your business. But an hour a day of breathing hard, I think is a really good protocol, and it seems like a lot, but I think you could resolve a lot of major health issues.

SHAWN STEVENSON: Yeah, when you just said, "It's up to you how you do it." Of course, I thought about sex, I thought about movement.

DR. ANDREW HUBERMAN: I'm sure that there's probably other modes.

SHAWN STEVENSON: You can make it creative with your breathing hard. This doesn't have to be this one-size-fits-all modality, and that's the great thing about all these things is that there's so much variety that we have to choose from right now, so... This is absolutely amazing. There's one more thing I want to ask you about because we're living at a time where there's a lot of stress, there's a lot of fear, and you being somebody who knows so much about the human brain, I'm wondering what the connection would be or the impact on excessive amounts of stress. Again, it's not that stress is bad, but excessive amounts of stress and fear, is there a connection between that experience and maybe some abnormalities taking place with our immune system and our immune response when interacting with pathogens?

DR. ANDREW HUBERMAN: Yeah, so long-term stress is bad for the immune system, this is based on data that goes back a long time, but the person who primarily gets the credit for this is a guy named Bruce McEwen who unfortunately passed away a few years ago. He was, I think well into his 80s, which is still early in my mind, but his lab at the Rockefeller University of New York has shown that when cortisol is elevated for too long or at the wrong times of day, it makes the immune system less effective in combating illness. So, learn to control stress and you will enhance your immune system.

The other thing that is, I think really important to understand is what is long-term, what a short-term stress. I think we can throw some kind of crude guidelines at it, if you are feeling like you're not getting good sleep consistently for three nights in a row, you're starting to enter a period of long-term stress. So, I think there are a lot of people out there that are in a mode of long-term stress, there are a huge literature out there of things that people can take ashwagandha and these kinds of things, but today we've mainly been focused on behavioral protocols, get the sleep right, etcetera. But if you're staying up late or waking up earlier and stressing throughout the day and how you're in chronic for more than three days, you're in chronic stress. So, I just want to be clear, 'cause we hear about short-term stress and long-term stress, but rarely do people actually define what's long-term. Now, resetting oneself can be

problematic, especially for people that have been in a long period of stress, and the last, whatever it is now, I can't even track 18 months. It's just been very difficult for everybody, no matter where people stand on the whole situation, it's just been stressful.

So, I think the practices that we talked about that actually might seem stressful, like the intense breathing, the cold showers, I wholeheartedly believe, based on data that those can actually help people reset their relationship to stress and start to get themselves out of this chronic stress mode. The other thing that I'd be remiss if I didn't mention is that there was a study published in Science Magazine, which is science nature and cell are the sorts of Super Bowl NBA championship, and I don't know give me another one.

SHAWN STEVENSON: Stanley Cup.

DR. ANDREW HUBERMAN: Stanley Cup, there it is. For the Canadians, Stanley Cup of science. And there was a paper published in Science last year, maybe it was... Yes, it was last year, showing that there is something called psychogenic fever, that there are areas of the brain that can convert a stress response into an actual fever. Now, this is important to understand why in addition to the fact that it can happen. Remember earlier when we were saying when you're stressed, you liberate all these killer cells in the short term that combat illness, and that's because you've got this one response system. Well, one of the ways that we kill pathogens, we kill bad things that enter our body is with fever. Fever is an adaptive response designed to kill viruses and bacteria.

Now, if fever goes too high, it can be dangerous, which is why people take fever-lowering drugs, Tylenol and things of that sort of lower body temperature, other things as well, but fever is designed to cook those things because viruses and bacteria only can survive in a very narrow range. So, it turns out that stress can actually activate fever now, whether or not one's stress is activated by a mental process or by some genuine thing that's invaded the body is rarely looked at. But it makes sense why you would have a fever just like when you're stressed about something, you get a shot of adrenaline and your heart races and you mobilize fuel to your legs, and that's why you want to move, it's hard to sit still when you're anxious or stressed, 'cause it's designed to move you. Well, if you're stressed about something, the body also will generate this increase in body temperature that will allow you to kill off something that you perceive has entered your body. So, I think the takeaway message is that stress in the short term is adaptive, it's good for us it combats all the bad stuff, stress that extends out more than three or four days and is disrupting our sleep for more than three nights in a row...

We really need to take that seriously. And whenever somebody says, "We need to take something seriously" that itself can be stressful. So I want to be kind in the delivery of this, don't become alarmed it's just start to think about what are the levers and buttons that we've

discussed today, the breathing, the cold water, the double inhale, long exhale, the sort of hyperventilation followed by a breath-hold, the trying to not sleep in a way where your airway is obstructed, nasal breathing, up light in the morning, all these things, try and think about which ones you can start to lean into without too much additional stress. And then let one of those open up the door to the next and to the next, so one door opens and another one, and so on. And I think that's the way to approach it because if we get into a catastrophic mode of, "Oh my goodness, I've been stressed for much longer than three days, and therefore my brain is inflamed and I'm going to dissolve physically and mentally." That itself is stressful, so we have to escape that vicious loop, and the way to do that is very straightforward, it's with practices, the information I hope is helpful, but it's tools that really make a difference and you got to use those tools. Knowing about them is the first step, but then you just have to implement them.

SHAWN STEVENSON: That's right. This has been phenomenal, and there's so many other things that we could talk about, and you've been talking about so many other aspects of science and human health on your new show. You just started a podcast recently. Can you let everybody know about your show and also where they can connect with you and get more information?

DR. ANDREW HUBERMAN: Sure, so the podcast is called Huberman Lab, and it's on YouTube, Apple, Spotify, all the standard places, and then on Instagram, I'm also Huberman Lab, and there I teach neuroscience in shorter snippets of a minute to five minutes. Some stuff that's covered on the podcast, but also some additional information, those are the two main places that people can find us.

SHAWN STEVENSON: Awesome, well, truly, this has been one of the funest experiences for me, and we've had a great time here and just being able to dive deeper into these things to look at what's happening in the brain with all the different kind of conditions and experiences we have in life, this is... I just want to thank you so much for doing this work and for making things accessible for people and demystifying these things, it's really such a great service right now, and I think that we need it more than ever, so truly, thank you so much.

DR. ANDREW HUBERMAN: Well, thank you, I really enjoyed our conversation, and I also want to tip my hat to you, you're a pioneer in delivering health information to people in an accessible form, and I really do... I'm honored and privileged to be here, but also that you and your other pioneers have allowed some space for me in the community, and it really is a community, so thanks for everything you're doing.

SHAWN STEVENSON: Absolutely, I receive that and listen, it's great having you in it because again, you're somebody that I like to listen to. Thankfully, our mutual friend Louis Howes told me about you, and I've just been blown away. I'm so grateful that you're doing this work and just excited to see what you do next, so...

DR. ANDREW HUBERMAN: Thank you.

SHAWN STEVENSON: Thank you, everybody. Thank you so much for tuning into the show today, I hope you got a lot of value out of this. Please pop over and share this episode on social media, take a screenshot and let everybody know what you're listening to and tag Dr. Huberman, tag me. I think it will blow him away to let him know what you thought about this episode. I think that this conversation is so important and how can we actually create healthier human beings by optimizing this amazing brain of ours it's what makes us human.

And right now, is the most important to focus on things that are truly sustainable, that have a ton... Absolutely, mountains of scientific evidence to affirm their efficacy, we can implement these things right now in our lives, in our family's lives, and then move that out to our communities at large, but it starts with us. So, it's taking advantage of these incredible things and also tuning in what are we feeding our minds on a regular basis and staying connected to amazing work like this, amazing science like this to keep us feeling empowered. I appreciate you so much for tuning into the show today, we've got some powerful masterclasses and amazing guests coming 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 could 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.