THE MODEL HEALTH SHOW

EPISODE 396

Tools For Faster Recovery: Sound Therapy, Vibration Therapy & More

With Guest Ben Greenfield

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Shawn Stevenson: Welcome to The Model Health Show. This is fitness and nutrition expert Shawn Stevenson and I am so grateful for you tuning in with me today.

Listen, have you ever thought about what the true limits of human potential are? Are we limited by our physicality, are we limited by our ability to think differently? Are we limited by our ability to express health and wellness or our ability to recover quickly from the things that we go through? Well, today you're going to find out that the human potential is actually boundless, we are boundless individuals, even our brain's capacity to learn, to process information, we're only scratching the surface on what we are realizing we're capable of doing.

You might have heard the statement that we only use maybe 10 percent of our brain, but that's not actually true. We, in fact, use 100 percent of our brains every day, even while we're sleeping there are different parts of our brain that are going into overdrive and doing a lot of work and even a lot of housekeeping. But the sad reality is we use 100 percent of our brain but we don't use it very well, we don't use it to 100 percent of its capacity.

And that's one of the things we're going to be talking about today is how do we actually improve that amazing organ that's governing our entire life. Our brain is where we're able to actually see, we're taking in the information we have these optical receptors but we're seeing inside of our incredible brain. So it's like a screen inside of our brain that we're really watching these things, it seems like we're seeing and taking in an outside world but that visual center of our brain is exactly towards the back of our brain.

That's one thing how we're seeing and taking information, site sounds, our senses. But also our brain is controlling our metabolism, if we talk about the hypothalamus, for example, which is kind of master gland in our brain is determining and communicating with our thyroid, which is regulating our metabolic rate, our adrenals, which is determining different hormones, are we

in a state of stress where we are potentially breaking down tissue in our bodies, our muscle tissue and turning it into glucose for fuel because we're running in this hyper sympathetic nervous system.

So your brain is controlling, based on your perception of reality and the awareness of the nutrients we have available in our system and the list goes on and on, it's controlling our metabolism. And so those are just a couple of aspects. Our emotions, our mood, how we feel, we have these neurotransmitters and hormones and your hypothalamus is actually the interface of all of those things, your neurotransmitters and hormones and determining how we feel and how our cells are communicating with each other, which is kind of important.

And so again, us understanding and supporting our brain health and also our physicality, the stuff from the head down, what's up there? How can we perform better, how can we increase our rate of recovery, what if we are injured? What can we do to get better faster? And so we're going to be talking about all of that today with one of the foremost experts on the planet. And his new work is going to talk about and teach you how to become boundless, and he is going to provide you with a ton of new things that you can have at your disposal throughout your entire life.

Before we do that I just want to give a quick shout to one of the things that we're going to talk about today which is helping to regulate your sleep. And today, more than ever, humans we're traveling, we're cloud hopping, we are moving around at a pace that our ancestors didn't even know was possible via train, plane, and automobile. All right, we can move around and the crazy thing is that your body is always looking for its place in all of this, it's looking for its ability to sync up with the environment.

We are hardwired to connect with the environment, the circadian rhythm, your circadian rhythm is matching up with the diurnal-nocturnal patterns of the Earth, every single day. And when you go, when you jump into a different time zone, the Earth and like your body, they are trying to locate each other to get synced up again, that's determining when your hormones are getting secreted, certain neurotransmitters doing their job, your motility in your gut, all of that stuff is trying to sync back and to find a rhythm.

And so this is why I'm a big fan of helping your body to reset when you travel. So

today a lot of people are leaning towards and reaching towards melatonin to help them to sleep better. And there's an issue with this because according to a study published in the journal of biological rhythms found that faulty timing or large doses of melatonin can cause a desensitization of your melatonin receptors.

Basically, your body will continue to produce melatonin and you can have melatonin supplements, but your ability to actually use it is going to go down, and when that happens, we can run into some serious problems. And so we want to be very judicious and cautious about our use of melatonin. Now I'm a big fan of melatonin in spot cases or there is some evidence towards micro-dosing.

However, in those spot cases, especially when traveling, when changing time zones it's a great time to utilize melatonin because it helps your body to sync back up. Melatonin isn't just about sleep, it's not a sedative. It's about regulating your circadian timing system. And so for that, I'm a big fan of sublingual spray under your tongue, hold that in there, high-quality, earth-grown nutrient source of melatonin, not something synthetic just because you can buy it at whatever convenience store or a pharmacy it does not mean that it's high-quality.

And also the dose can be problematic especially if you're taking pills, like to find the right dose for you versus a couple of sprays. And so for me, that's why I'm a big fan and I travel with it when I'm changing time zones— Onnit's sprayable melatonin. And you can get yourself access to that at onnit.com/model, that's O-N-N-I-T.com/model, you get 10 percent off their sprayable melatonin.

I travel with it, I keep it in my bookbag, my Dora The Explorer, it's one of the things that I reach for when I travel, and especially when I am changing time zones or if you've had a couple of rough nights of sleeping and you just want to get back on track but you just want to avoid using high doses, like what the research says and using it in a haphazard times as well and taking it too long.

So spot cases to get yourself reset, to get back on rhythm. It's a great thing to have access to. So I just want to make sure that you knew about that and that you're getting yourself a good source of melatonin, if you are using it especially again for the spot instances.

And they've got some other cool stuff as well, their pre work out is the best by

far because they've actually done double-blind placebo-controlled studies on their Shroom Tech sport to find its efficacy in improving sports performance, so being able to lift more weights, being able to have a boost in the cardiovascular function, about 8.8 percent increase in cardiovascular performance by utilizing Shroom Tech sport which again, all earth grow nutrients, nothing synthetic.

So pop over there, check them out, it's onnit.com/model, and you get 10 percent off. And my guest today, big fan of Onnit, and actually I think the last time that we saw each other was at an Onnit event, so big fans of Onnit and I think you will be as well. Pop over there check them out, onnit.com/model for 10 percent off. And now let's get to the Apple Podcast review of the week.

iTunes Review: Another 5-star review titled "Grow your knowledge, fuel your mind, health will follow" by JB147. "I've listened to Shawn for more than a year and it continues to provide me with the knowledge, the will and yes, the health. His ability to speak on the level that doesn't intimidate but welcomes the listener to learn, grow and get and be healthy— thank you, Shawn, and all those behind the scenes for giving me the power to health my health."

Shawn Stevenson: I love this so much, "The power to health your health," thank you so much for sharing that review over on Apple Podcasts and thank you for allowing me to be a part of your life and your story. And today we're just going to take it another step further with our special guest. And please remember, if you've yet to do so, pop over to Apple podcasts and leave a review for the show and whether or not you're watching this or listening on a different platform, leave a review, leave a comment and let me know what you thought about the episode as well.

All right, now let's get to our special guest and topic of the day. Ben Greenfield is a human performance consultant speaker and New York Times bestselling author, and he is an author of 13 books, by the way. And he's a former collegiate tennis player, water polo player, volleyball player, bodybuilder, 13 times Iron Man triathlete and professional obstacle course racer. And Ben has been voted by the NSCA as America's top personal trainer and by Greatest as one of the top 100 most influential people in health and fitness.

And Ben also hosts the highly popular fitness nutrition and wellness website BenGreenfieldFitness.com, a site with over a million monthly visitors featuring articles, podcasts and product reviews from Ben. And now he is back on The Model Health Show to talk about his new book "Boundless: Upgrade Your Brain,

Optimize Your Body & Defy Aging." Incredible nuggets of wisdom here in this episode, so let's jump into this conversation with New York Times bestselling author Ben Greenfield.

Shawn Stevenson: I don't think that I've told you this, but prior to us moving here I lived in the woods, a place called Wildwood Missouri, but literally, in the woods and my closest neighbor was, I don't know, maybe 300 yards away. And we had a nice little trek to the mailbox, we had this super steep, barely paved road to get to our house. And it snowed one year and it just got covered in ice and I was listening to my oldest son, he was like, "You can make it," to my wife's SUV because there was a dip and you come up. I was like, "He's right, and if we die, he'll help, he'll get us out of the ditch."

And so I hit it and we got like maybe 5 or 6 feet from my driveway just started sliding backward. And I was turning the wheel you know, the opposite direction, hit the emergency brake, I'm flipping out, I'm like, "We're going to fall in the ditch," but I didn't say it out loud. And my oldest son, he is the most scary person in our family, scary movies as well, which we'll talk about when we talk about your book. But he was just so calm, he was like, "Dad, everything's fine. It's going to be okay." And I'm flipping out, I was like, "No, it's not."

Ben Greenfield: He has got that, what's the gene that all the navy seals have, the COMT gene, that just turns out dopamine in response to excitatory activities. He's probably hardwired for that.

Shawn Stevenson: I don't know, I just scared him yesterday walking into the house, I don't know. But anyway, so we ended up just feet maybe a good 20 feet, I am probably over exaggerating from the little creek at the bottom. And my wife was like, and we had to shovel the whole street just to get up there that night. And that's when my wife decided that we are officially moving, we're not doing this again. And so but that experience of living kind of off the grid, there are no artificial lights anywhere, people come out to the house and they are just like—

Ben Greenfield: G panels, yeah we live in a very similar scenario, a quarter-mile-long driveway steep uphill and I didn't plow for the longest time because I'm cheap and I finally bit the bullet and have like a plow guy, with a good pick up and a big plow. And his instruction is just anytime it dumps snow just come up and plow and the reason, like the turning point for me, was when I got a massage one night at my house and the massage therapist slid off the road going down and I'm all

relaxed at night to spend the next 3 hours digging her out of the snow I'm like, "Screw this, this is not worth it," so I just, I got it, and now the mailman can come up and people can come up and we don't have to just select friends who have all-wheel drive.

Shawn Stevenson: Yes, that is called blowing a high, when you got that massage and had to go do that.

Ben Greenfield: I know, and it was literally blowing a high, because usually before I, because I'll get like these grand 2 or 3-hour massages usually Wednesday night at my house and I'll pop an edible and get super relaxed, so literally I am high, relaxed and want to go to bed and I am digging in the snow instead.

Shawn Stevenson: Dude, 2 to 3-hour massage, I've never even heard of such things.

Ben Greenfield: It's amazing, I have one of those pulsed electromagnetic field tables, that's like an anti-inflammatory table kind of opens and closes cell membranes and it gives you these full-body parasympathetic responses while I lay on that and then I've got to like sound healing speakers on either side of the table that blast me with these healing frequencies when I am getting the massage and diffuse the essential oil and it's just like nirvana. She will usually come over like 8 or 9 PM and I'll get a massage till midnight and then just crawl into bed.

Shawn Stevenson: Yeah, that's amazing, man. You talked about sound healing in the book as well. And I was really pleasantly surprised because again, both of us being a little bit more analytical about stuff and this is something I just wouldn't give much credence to, but I experienced it first and then I looked into the data, like, "Okay, there's something here." But then, of course, it hits you just like, "Of course, it makes sense."

Ben Greenfield: Well, there's some data showing that vibratory frequencies delivered via sound can elicit certain brain wave patterns like alpha or beta or theta, or whatever, usually we're looking for alpha or theta or delta. And so there are sound healing practitioners, one of the more famous ones down in Sedona, Arizona who I have interviewed before, Porangui. And he just blasts you with the didgeridoo, all manner of drums and he's got a sound healing table.

Shawn Stevenson: He's got a whole like a DJ set.

Ben Greenfield: Do you know him?

Shawn Stevenson: Of course. That's why I'm like, "Oh, okay, there is something here."

Ben Greenfield: Yes and he does bodywork at the same time. And so we know the frequencies can change brain waves. And then there is another book I think it's called "Tuning the Human Biofield" that goes into the utilization of tuning forks at specific frequencies that can vibrate at the same frequencies at certain cells in the body, vibrate and could be specifically used for a liver, neural function or thyroid or what have you.

And then the interesting thing is that I met this guy a few weeks ago and I also interviewed him and he worked with the MAPS foundation on trauma and PTSD which right now is kind of being treated with increasingly MDMA and ketamine and psilocybin and he wanted to figure out if there was a way to do this without the use of drugs or plant medicine. And he developed a device called the Apollo which you wear on your ankle or your wrist and it transmits an inaudible sound frequency that elicits a similar neural response as plant medicine.

I've been messing around with that for the past month, you can set it on sleep, you can set it on social, you can set it on wake up, you can set it on meditate and that definitely does something. I agree with you there's not a great deal of human clinical research on sound healing but anecdotally, I am sold in the other really cool thing that I just discovered. Have you ever seen a hand drum or a hand pan?

Shawn Stevenson: I don't think so.

Ben Greenfield: These are drums, they look like a steel drum kind of, and you place it in your lap and you strike it, usually with your thumbs or the ends of your fingers or an open palm, and because it's in your lap as you're playing it, these vibrations just travel through your entire body, it's incredibly soothing, almost like a harp. And every single drum is tuned to a specific scale, like mine is in the skill of B and there are 9 spots that are marked that you strike, so it's impossible to sound bad on it, because it's all in the same scale, so you can play anything and it just sounds like you're a pro.

So it's really cool for somebody who wants to get the benefit of the neuroplasticity that music can give you and some of the BDNF, the vagus nerve

activation, all these things we know that music can deliver, but then have that combined with not having to work super hard to learn a musical instrument and get the sound healing effect at the same time because it's in your lap, so all the sounds are going straight into your body. So there's definitely something cool about the sound healing thing.

Shawn Stevenson: Man, and you just kind of went into it a little bit, but I want to talk about some of the benefits that sound can deliver like you just mentioned uptake in BDNF, you mentioned the brain waves as the first thing. So shifting from this kind of Beta state into that Alpha, Theta. So what would this do for us? I would imagine we'd get a little shift over in our sympathetic nervous system?

Ben Greenfield: Yeah, so the Alpha- Beta ratio is one of the more important ratios with Beta brainwaves being those fast oscillating brainwaves that are typically associated with the sympathetic nervous response. They aren't bad, I mean they're also associated in many cases with the state of hyper-focus or a state of increased athleticism, or you'd want high Beta wave frequency or even figure out a way to elicit high Beta wave frequency if you're dropping onto the squat rack or doing something for which you really want it to be activated.

But most people are in high Beta throughout the day, which, of course, ties into everything from poor vagal nerve tone to increase sympathetic nervous system activation. And so you'd ideally during the day want to shift yourself into Alpha, the state of focus that an athletic performance or a memory performance or cognitive performance would be referred to as the zone, or like the Alpha zone kind of like a 10-ish, 8 to 10Hz-ish frequency. And then in the evening, you'd want to shift yourself more into a Delta or even a Theta frequency with Theta being that deep, deep meditative state that you'd also access a little bit during deep sleep.

So the brain waves can be altered by sound, they can be altered by other means too, binaural beats are technically a sound that you can play through speakers, through like a noise isolation headphones. I like an app called Sleep Stream, I talk about it in the book, it's kind of like a DJ for sleep and you can put a little piano sounds on it, you can select brown noise or pink noise or white noise or some type of noise that covers up ambient sound and then you can select your binaural beat frequency for Alpha or Beta or Delta or Theta. And so that's another way that you can do it. There's actually a practitioner here in LA who has a place called The Peak Brain Institute, have you heard of this?

Shawn Stevenson: I have not.

Ben Greenfield: Doctor Andrew Hill and he actually practices neural feedback that is specifically designed to train your brain almost subconsciously, to go into the brain wave states that it needs to shift into. So what he does is a QEEG. That's an electric scan of the brain to see which signals are firing and win and if you have certain areas of the brain that are drifting into high Beta or low Alpha, or let's say you have poor sleep onset, it would be poor activation of Delta or Theta frequencies.

And then what he does is he has these electrodes that he attaches to your head, this is just based on neurofeedback science. And you then with the electrodes attached to your head which are monitoring your brain wave patterns, you will play a game on a computer screen where you're looking at the computer and, for example, you're flying a spaceship.

And the software that the computer is running is connected to those electrodes and so every time that you shift into let's say high Beta, that stressful state the spaceship will stop flying, the music from the game will kind of decrease and even the screen will start to fade. And your brain subconsciously sees that as a slap on the wrist and it wants the reward mechanism of you going into high Alpha.

So then once you— you can't think yourself in the high Alpha, but it's very strange because if you subconsciously just realize that the spaceship stopped flying, the ignition stopped coming out the back, the music faded away. If you focus your brain starts to shift back into Alpha state and by playing this game repeatedly you can begin to downregulate Beta or begin to train yourself and get into the brain waves that you want to get into.

And I trained with him for a while, I even bought the equipment from him and brought it to my house because I didn't want to fly to LA to do brain training. And what I discovered is that you can even watch a movie with the electrodes attached and when you're watching the movie, if you shift into Beta or a state of increased distractibility, the movie will start to fade and the sound from the voices will start to fade.

And so you can just watch Netflix and be training your brain simultaneously to go into the brain wave states you want it to be in. And the 2 things I noticed the

most from during that training because I did have some high Beta areas were decreased distractibility, meaning I used to say walk into a cocktail party and I would have difficulty focusing on the person that I was talking to because I could hear like the 8 other conversations going on around me and it was kind of like the, "Oh hey, there's a squirrel type of thing," and my eyes would dart over to the cocktail bar, over to the snack table or for the conversation going on behind me.

And that allowed me to decrease that distractibility. And then the other thing was faster sleep onset, which is also known as decreased sleep latency. So I fell asleep faster because I was in less Beta during my sleep cycle or during the lead up to falling asleep. So yeah, there are a lot of different ways that you can track these brain waves. And you asked about the vagus nerve. Training that is just fascinating.

Shawn Stevenson: So can we first, let's talk about what it? The vagus nerve. It's like a big topic, a big part of the conversation today. I think it's only recently discovered that there's such a big connection between the vagus nerve and what's going on in our brains.

Ben Greenfield: Yeah, how profound an impact it makes, about 80 percent. Well, I should start here the vagus nerve originates in the head, it originates from the cranial nerves, but then it snakes through and innervates nearly every organ in your body, your liver, your thyroid, your thymus, your pancreas, your small intestine, your colon and it's responsible for the proper function of many of these organs.

So if you have poor vagal nerve tone, it can affect everything from the release of bile by the gallbladder and production of bile by the liver to be able to digest a meal to the creation of immune cells by the thymus, to the production of insulin and other digestive enzymes by the pancreas, to the motility of the small intestine to the flora in the colon. What this means is that if you are in a state of constant sympathetic nervous system activation that is synonymous with poor tone of the vagus nerve, meaning because you're in fight and flight, the vagus nerve downregulates the intervation to all these organs.

So that you can run from a line and activate your muscles. If you can engage in activities that strengthen the vagus nerve or that increase its tone and that also allow you to be in a parasympathetic state, it's beneficial for a wide variety of issues from poor digestion to poor insulin production and blood sugar

management, to poor immune function, to constipation, to all of these things that the vagus nerve is responsible for helping to control.

There are a variety of ways that you can increase the tone of the vagus nerve and there are also ways to, even in real-time, track the efficacy of those efforts. So for example, some of the things that would tone the vagus nerve would be anything that involves gargling, such as every morning just gargling for about a minute or so with some warm water with a little bit of lemon, I like to use oregano because it kind of cleans up the biome a little bit. You can chant, sing or hum which is one reason why omming such a calming activity used in meditative or Yoga practices.

Shawn Stevenson: Chant, sing.

Ben Greenfield: Chant, singing, it activates your parasympathetic—

Shawn Stevenson: Like a Thong Song or like—

Ben Greenfield: Probably not the Thong Song or heavy metal but just singing. In our house as a family, we sing a lot, we gather together as a family and we'll often have like meditation and prayer and journaling in the morning, but then we sing afterward. I sing the kids to bed at night, there's always some kind of a tune being carried in the Greenfield house.

Shawn Stevenson: It makes me think like how singing and song have been just throughout human evolution for a reason.

Ben Greenfield: We're intimately tied to it, not only because of the sound frequency impact that we were talking about earlier but also because of the motivational effect of music and there have been studies done on decreased tolerance or increased rather tolerance to pain, decreased time to exhaustion during exercise. We know that armies, of course, used to march in a battle with a drummer or some form of music such as trumpets. I do not necessarily discount that even we find stories such as in the Bible of the Walls of Jericho being disintegrated by thousands and thousands of Israel like trumpeters blasting at the walls, that that could not from pure physics standpoint have happened.

So there are a lot of interesting uses of music and examples of music as both a weapon and a relaxation tool in culture. In addition to music, another

interesting one is cold water. Cold water for anything that involves cold water immersion of the face, so a cryotherapy chamber, those are becoming very popular, is useful for things like fat loss or decreased information or a slight upregulation in energy, but it doesn't do a whole lot for the vagus nerve, because you have to activate, to tone the vagus nerve what is called the Mammalian Dive Reflects and for that to occur, your face must go underwater, or you must splash your face with cold water.

This is one of the things that they'll do with babies to activate their vagus nerve when they are first born and to cause things like deep diaphragmatic breathing and activation of some of those digestive responses in a baby, there's actually something to splashing cold water in a baby's face— it sounds like child abuse these days, but it's very common practice among many cultures to dump your baby in cold water or splashed cold water on their face very soon after birth. And to continue to do so for several months after birth to continue to tone the vagus nerve in an infant.

So we have cold water, meditation, singing, chanting, humming, yoga, there is a variety of ways that you can activate the vagus nerve and music is another. And if you want to actually see if your efforts to increase the health of your vagus nerve are working, one of the best ways to do that is via what's called a heart rate variability measurement, also known as an HRV measurement.

And this usually involves placing a Bluetooth enabled chest heart rate strap along your chest. There are some wearables like I'm wearing this Oura ring right now which tracks it, be in my finger, the wrist bands now like the Whoop or the Garmin that will track it via a wristwatch.

None of these is as accurate as something like a Bluetooth strap that you wear around your chest, but what any of those devices will tell you is whether your heart rate variability is high or low, with heart rate variability not being your actual heart rate but the amount of time in between each heartbeat. And if the amount of time between each heartbeat has a slight delta, a slight variation in the beat to beat time interval, that's an indication that the peacemakers cells of your heart are working properly, what is called the SA, the node in the heart called the sinoatrial node and this is responsible for innervating those cells in the heart causing proper electrical activity of the heart and the SA node is fed by the vagus nerve.

So if you have good vagal nerve tone what that means is that your heart is able to engage in these mild beat to beat variations, meaning that when it's time to go sympathetic, you can go sympathetic very quickly, like let's say somebody runs in here and they've got a whatever, their pet tiger on a chain and you and I got to jump out the window.

Shawn Stevenson: Mike Tyson. He's been in this room.

Ben Greenfield: Yeah, exactly. If Mike Tyson wanders in here, okay there we go. If he comes back—

Shawn Stevenson: With his tiger.

Ben Greenfield: And he's not being nice or his tiger is not being nice and you and I have to go from sitting her all relaxed and chatting in these chairs and jumping out the window, good vagal nerve tone would allow us to go boom out the window, whereas if we had whatever, you know, chronic fatigue or adrenal issues, we might be a little less sprite.

And when you are stressed out, of course, you would want the opposite, you'd be able to want to when you're stuck in traffic take one deep breath in through the nose, out through the mouth, activate your parasympathetic nervous system, because you've trained your vagal nerve tone to be able to make that shift very efficiently.

And all you're doing when you're tracking your HRV is you're seeing that if it's low that's a sign of poor vagal nerve tone and if it's high that's a sign that something you're doing is increasing your vagal nerve tone. And so that's a good way to actually kind of keep a real-time metric without having to get some fancy tester or a blood panel or something like that to look at other stress or inflammatory markers.

See, the vagus nerve is very interesting and one other thing is that the predominant neurotransmitter that it uses because all nerves will use neurotransmitters to propagate a signal from one nerve ending to the next is acetylcholine. And acetylcholine is a neuro transmitter. The first chapter in the book actually is all about neuro transmitters and how to balance them, how to increase them, how to decrease them, things that exhaust them.

And the vagus nerve relies upon acetylcholine and so if you are, for example, eating sources of what's called the acetyl CoA and eating sources of choline in your diet, those 2 combine to form acetylcholine. So you could get acetyl CoA it's found in higher quantities in animal foods and some antioxidant-rich plants and beverages like Rhodiola and adaptogens like Reishi and Cordyceps.

You'd also find choline in things like walnuts, fish, eggs, so eating a diet that has like herbs and spices and wild plants along with walnuts and fish, eggs, it's a good way to keep your acetylcholine levels elevated. And, of course, there are many, many nootropic brain supplement manufacturers out there who have picked up on that and who now include acetylcholine as an actual ingredient in their supplements.

The other one that is interesting is that the receptors that are used to interact with acetylcholine are known as nicotinic acid receptors. And it turns out that the use of nicotine can actually be helpful for activating the vagus nerve if someone has poor vagal nerve function you wouldn't want to smoke a pack of cigarettes but the use of something like small amounts of a nicotine gum or a nicotine tincture, a nicotine patch can help people sometimes with vagal nerve function.

And I actually interviewed one woman who works with a lot of patients who have constipation and she'll use nicotine, she'll literally place a nicotine patch over the ileus equine valve on the lower right side of the abdomen to cause the an opening of that valve in someone who is poor peristalsis and poor opening of that valve due to poor vagal nerve function and use nicotine is one way to retrain that valve and then combine that with acetylcholine supplementation. And so you can get pretty biochemical with this vagus nerve and there's a lot of cool ways that you can enhance its health.

Shawn Stevenson: Yeah, man, that is so fascinating, so much good stuff there. I was just talking with Kelly Starret and he was reminding me of the benefit, and you probably have talked to him and know about this gut smashing? Can you talk about that a little bit?

Ben Greenfield: Yeah, well there are kind of 2 different reasons that one would do something like that. And I should put the caveat out there that smashing, I'm sure everybody, or a lot of people kind of grimaced when you thought smashing the gut, that sounds painful. So the reason would be for—

Shawn Stevenson: Just really quickly, it's basically getting like a little princess ball like at a Walmart or whatever and you know the kind of soft plastic balls might have Frozen on it or Spiderman.

Ben Greenfield: Winnie The Pooh.

Shawn Stevenson: Winnie The Pooh. And you just lay on it on your belly and move around a little bit, it could kind of "smash your guts" but the most important part which is the breathing into it, which we'll get to.

Ben Greenfield: Yeah, you expand your diaphragm, you breathe into the ball typically you are prone and the ball is underneath you and you're placing pressure against the ball and you can find some tight spots, and when you find tight spots you hold the ball there and breathe into that tight spot.

Pooh would probably be a fitting analogy in this case because for many people who struggle with the morning bowel movement this is a great little hack because you're just kind of engaging in your own built-in peristalsis rather than relying upon your intestines to move things through themselves, you have impacted matter in the colon or somewhere in the intestine or sluggish peristalsis, you can use this as a way to kind of jumpstart that.

And you don't necessarily need to do the got smashing in a prone condition, for example, if you don't have anything at all, you can use the meat of your palm to just kind of push across your abdomen, follow the path preferably of your colon which is starting from the right side of your ribcage down over to the left side and then you move down the left side and then once you get to about the level of your belly button you come across the right side and then once you get across the right side you go slightly down, just with pressure using the palm.

And you can simulate that same movement by literally moving your body over a ball and do something like that if you're going for the peristaltic effect, the digestive effect. There are also a variety of massage tools now that vibrate and I think something like a theragun gun or a hypervolt, any of these things that are used for targeted deep tissue therapy they are too pointy, they are too pokey and I think you risk organ damage if you push with those against your abdomen.

There are others that are shaped more like a car buffer and I have one in my

bathroom and I will put it on and just use it like a car buffer over in the exact movement that I just described doing that for about one to 2 minutes right before I go to the bathroom, and it's wonderful for increasing peristalsis. That's one reason that you would do something like gut smashing be for that.

But I would say just as important as the fact that many people, especially people with low back pain or hip dysfunction, they have very tight iliacus and psoas muscles and those are located right up there around either side of the belly button, and if someone were listening right now and you put both hands on your hips and you're kind of feeling with 2 fingers on either side of your belly button, you'll find some tight spots in there.

And when you place the ball in those sections, you just put pressure with the ball against those sections and you just hold and again do deep diaphragmatic breathing into that section, you can release the psoas or release the iliacus. When you have a massage, many massage therapists will do what's called visceral therapy, where they will actually work in some of those sections that's actually fantastic for the vagus nerve as well and sometimes they'll dig their fingers very deep kind of under the rib cage for the diaphragmatic release and then on either side the hips for the iliacus and the psoas release.

That can be very effective too, to have a massage therapist do that. And then you want to proceed at your own risk with this and pay attention if you have any organ pain, you don't want any sharp pain or something like this, because there are organs in that area and you don't want too much pressure, but if let's say you're an athlete with very, very tight abdominal muscles and very tight psoas, the other thing I found to be useful is rather than using those very softballs to get something like a harder ball.

There's a company called Hyperice and they make aspheric shaped balls that vibrates, so you push a button on the ball and it begins to vibrate and you can place that over a section, I found that to be very efficacious for a psoas release. Similarly, there's a company called Psorite, P-S-O-R-I-T-E and they make a small plastic device that's perfectly shaped to do both sides at the same time and you just get in a prone position over the psorite and you push your hips and your ABS into it, and you can get a release on both sides at once, if you just need a quick fix, it's light, you can travel with it.

And so there are a few different ways that you can gut smash and depending on

where your areas of tightness are and how tight your abdominals are, you could kind of choose your own adventure. But yeah I love the idea of paying as much attention to your diaphragm, your psoas and your iliacus as you might, your trapezius or the upper part of the back or somewhere else you might traditionally massage.

I think the abdomen is often neglected along with the pelvic floor muscles because in many cases especially for people working with the massage therapist or working on themselves those are difficult areas to access and they're also in westernized cultures considered some taboo areas for someone to be touching and feeling and pressing against, but they need tissue work just like every other part of the body.

Shawn Stevenson: Yeah, and this is so much good stuff here. I want to go back and talk about, you briefly mentioned neurotransmitters and you start the book off with this, and it's super fascinating, you're talking about this concept of neurotransmitter dominance. So we're going to talk about that right after this quick break, so sit tight, we'll be right back.

Growing up, if I thought about chocolate I think about 3 musketeers, I think about a Kit-Kat, Butterfinger, right. I had all these ideas, hot chocolate, chocolate ice cream, chocolate cake, those are the things that would conjure up in my mind when I thought about chocolate. Little did I know that chocolate itself, the original root of chocolate which comes from something that's botanically a seed, these cacao seeds were one of the most healthy foods in the world.

Listen to this, this was from a randomized, double-blind placebo-controlled trial that was published in the American Journal of Clinical Nutrition found that polyphenol-rich cacao or cocoa without the sugar has a remarkable prebiotic effect on the human body. So what the study found was that folks who are consuming this sugar-free cacao flavanol drink for 4 weeks significantly increase their ratio of probiotics or friendly bacteria.

Bifida bacteria, for example, wow significantly decreasing their class of firmicutes, which is associated with fat gain, so there are certain types of bacteria that are associated with gaining fat in these firmicutes. So the saying in health right now is that if you want to be firm and cute you've got to reduce the firmicutes, I didn't make that up, somebody else did, all right. But the bottom

line is, wow it has a really powerful, remarkable impact on what's happening with your microbiome.

The study also found that it was able to reduce levels of systemic inflammation measured by something called C reactive protein and if that weren't enough, cacao also has these compounds that have a really powerful influence on our mood, like Anandamide which is known like, that translates to me in bliss chemical right. Serotonin and tryptophan, these precursors that help your body to produce things like melatonin, right that helps you sleep better.

It goes on and on and on, but the quality matters a lot. And when you get real chocolate into something that is even more health-giving, you've got something really special. And that's what they have with the new Chocolate Ogranifi Gold drink. So they've got the chocolate along with their incredible, delicious turmeric formula, and as you know, turmeric has very powerful anti-inflammatory properties.

And it also has been clinically proven to have anti-angiogenesis properties, so this means that turmeric literally has the ability to cut off the blood supply to cancer cells. And we all produce cancer cells every day, but a properly functioning immune system and being able to regulate this angiogenesis which we need, but we need at certain levels, is incredibly important and food can help to regulate that. So I'm a huge fan of Organifi, now they've got the new Chocolate Gold.

Alright, so pop over there, check it out, just released, just delicious. Organifi.com/model, you get 20 percent off that and everything else they carry. Alright, so head over there, check them out, organifi.com/model, that's O-R-G-A-N-I-F-I.com/model for 20 percent off. Now back to the show.

Alright, we're back and we're talking with New York Times bestselling author Ben Greenfield about his new book "Boundless." This is absolutely essential to have in your library and there are so many incredible sections, it's just like if you have any type of question on health, fitness, recovery, nutrition he's covering everything in this book, it's amazing.

Ben Greenfield: The blockchain.

Shawn Stevenson: The blockchain.

Ben Greenfield: Trump, Hillary everything— no. I am a complete dummy on anything except health.

Shawn Stevenson: That's so funny, the same thing would be just like, my uncle was trying to give me a few years back to like do something with the car, I'm like I just don't get that, like I could help with the body but that's not my bat.

Ben Greenfield: Yeah, I used to be a renaissance man and I find increasingly, I am just focused on my passion right now which is health and nutrition.

Shawn Stevenson: Master of one thing.

Ben Greenfield: Yeah, and I mean, there are like parenting and spirituality, and music, like there are a few other areas I delve into, but the book you're right, it's just about mind body and spirit optimization.

Shawn Stevenson: Yeah, and all of those things really tie together too, when we're talking about community and family and the mind-body tie in, and this is what I really love about the book is that you're expanding on some ideas that you don't typically get in a traditional fitness nutrition book.

And one of these, there's a new concept that you address which is this neurotransmitter dominance. So we usually, when we hear about that I think of like, I immediately thought of estrogen dominance, I immediately thought about, "Oh, that's a problem," but that's not necessarily the case. So can we talk a little bit first what is neurotransmitter dominance and how do we address this?

Ben Greenfield: Yeah and to back up real quick, estrogen dominance actually is pretty interesting and it is a big issue, I was at a health summit yesterday and I listened to a talk in which the problem with estrogen dominance in both men and women exposed to a lot of plastics, estrogen balances due to the use of birth control, a lot of issues.

I didn't realize how big of a tie there is to a variety of issues coming to vagus nerve we were talking about, especially thyroid, estrogen dominance downregulates T4 to T3 conversion it can cause damage to the thyroid gland, I mean it's a pretty big issue this idea of estrogen dominance on a lot of women,

especially struggle with that. Man increasingly too, who are either using fragrances or plastics or even using testosterone like troches or pellets or injections or creams, but aren't monitoring those with a physician to see if they are over traumatizing in the estrogens.

It's a big issue, estrogen is a hormone, but there are other things like serotonin and the acetylcholine I was talking about earlier, gamma-aminobutyric acid also known as GABA, dopamine and some others, these are all neurotransmitters, they are not hormones, they are chemical messengers that the nerves use to propagate signals throughout the body. For the most part, they are either excitatory, such as dopamine being the most popular example of an excitatory neurotransmitter.

And inhibitory, GABA would be a perfect example of an inhibitory neurotransmitter, I have many of my clients actually keep a little bottle of GABA next to their bedside when they wake up at night it's one of the ways to get back to sleep quickly, so just take a little liposomal GABA underneath the tongue and it just kind of floods your body with some of these inhibitory neurotransmitters, if you have racing thoughts or excitation when you wake up, it's a good way to get back to sleep.

Some people are hardwired to be more excitatory or more inhibitory, so if you are, for example, dopamine dominant you're fueled by activities like skydiving and we see many navy seals are dopamine dominant, it's people who thrive on exciting adventurous activities.

They don't need to feel bad about that, as a matter of fact, that feeds directly into their built-in propensity to be dopamine dominant and in historical terms, they would've been athletes or lawyers or gladiators or sometimes entertainers, people who thrive on these exciting adventurous activities, whereas someone who's let's say GABA dominant, they should fuel themselves with art and music and more passive activities that fuel that an inhibitory neurotransmitter tendency.

At the same time, you can if you are of a certain dominance type, and I have a whole quiz in the book and even if you wanted to a urine test like a DUTCH neurotransmitter test, for example, or specter cell analysis, you can actually look at where you're at in terms of neurotransmitters.

And let's say someone based on their quiz is a dopamine dominant person, but you test them and their spectra cell analyses or their DUTCH analysis would show levels of homovanillate or some of these other neurotransmitter metabolites that are in balance, they may not have enough dopamine to be able to actually feel good, especially based on the fact that they're more dopamine dominant.

So those might be some, those would be people that would, for example, benefit from the consumption of cacao or the use of the supplement Dopa Mucuna or some of these other dopamine precursors that kind of bring them back into that feel-good state that they need to be in because they are dopamine dominant person.

Shawn Stevenson: Can we see something where we have the example of somebody like a hard-charging, adventurous—

Ben Greenfield: Who all of a sudden starts to get tired, lose their love for life and doesn't feel as motivated to get out and do stuff, it doesn't necessarily mean you're getting older and losing your fire, it can just mean you've got some neurotransmitter imbalances going on and a little bit of supplementation can help, someone who's GABA dominant might need a little bit more of that inhibitory neurotransmitter if they're just overloaded with sensory stimulus living in a western, post-industrial environment surrounded by bright LED lighting and backlit screens and movies at night, and Netflix and traffic and they're just not wired to handle that.

And so they need a little bit more GABA or a little bit more inhibitory neurotransmitter support to actually help them get back into feeling good based on their dominant state. And really, one of the best things you can do to care for your neurotransmitters, I would say the 2 most important things, I talk about a lot in the book, but the 2 most important things would just be to be cognizant of sensory input.

For example, when I rode my bicycle over here I was listening to a podcast and I realized about halfway through the bike ride, "Why am I playing this so loud, it's way louder than it needs to be." And whenever I am cognizant of that, I'll decrease the audio volume of what I'm playing to where it needs to be, so that it's not too loud.

And the same thing when I'm watching a movie. If you are watching movie at night you try to choose more passive forms of entertainment like a drama or maybe a comedy instead of action or horror and even then you wear blue light blockers or put something like a drift box in the HDMI cable input of your TV which will suck all the blue light out of the screen.

Shawn Stevenson: Let's talk about that really quickly, because you made a specific point to mention horror movies in the book. And it's just like, it's so funny and I've literally never shared this before, but my wife knows I grew up just obsessed with scary movies because of a childhood incident, I've talked about it on the show, but my mom went to the drive-in with my stepfather when I was 5 and my little brother was like, he's an infant, I am like 4 or 5 years older than him and they went to see "A Nightmare on Elm Street". I'm 5! So Freddie was in my dreams for good 10 years, not 10 years, maybe 8 years.

And I had to just kind of, and I never shared it, but I got addicted to it, right, so I had to get on my bike and ride the star video, get the newest, scariest movie. And then all of the sudden, it was about 15 years ago I was just done, I was like, "Why am I going to scare the out of myself?" And I just stopped watching scary movies. I'm not against them, it's great, we've got "It" Stephen King, whatever, I see the stuff, but I'm just like, "Yeah, I have no interest in that."

Ben Greenfield: Yeah. Yeah, it's a sensory stimuli that's very, it's an overload for the brain that in many cases the lizard brain, it really has a difficult time identifying that that's not real, that there's not actually a threat, that there's not actually a creepy clown in the room and that can cause an excess sensory input that can exhaust neurotransmitters long term, gratuitous violence and the possibility for that to induce some societal violence, potential for that aside, it can just result in neurotransmitter overload.

As can drinking too many cups of coffee during the day, you know, the overuse of stimulants, whether it's nicotine vape pen or 5-hour energy, I mean any of these things you shove neurotransmitters in overdrive and even many of the better-formulated nootropic or so-called smart drug blends out there, they'll add things to the blends that help to replenish neurotransmitters like acetylcholine, like minerals and like amino acids and things like this that actually help the neurotransmitters to rebuild more quickly.

And that's actually related to the second thing that I wanted to bring up, being

cognizant of avoiding access sensory input, especially as the day is winding down is important. But so is paying attention to the building blocks that your body uses to create neurotransmitters. With the 2 most notable building blocks being a good vitamin B complex this is especially important for plant-based dieters because most people who eat meat are getting plenty and adequate amounts of the vitamin B complex but I think anyone who's vegan or vegetarian should be supplementing with vitamin B.

If anything for neurotransmitter function and we know that because of everything from creating deficiencies the taurine deficiencies to fatty acid deficiencies that a plant-based diet does put you at risk for cognitive dysfunction unless it's properly structured unless you're actually supplementing with those building blocks. So vitamin B is important and then the other thing that's used to create neurotransmitters are amino acids.

I know that in this day and age there's kind of an infatuation with enhancing longevity via inhibition of something called mTOR which is essentially the switch in the body that turns on anabolism and is also stimulated by high levels of proteins, especially amino acids like lysine or methionine and I certainly think that being cognizant of excess protein intake and especially being careful not to take in too much lysine and too much methionine is a smart life-extending strategy.

But at the same time, once you begin to drop below about 0.55 grams of protein per pound of body weight, you limit amino acids to the extent where not only muscle protein synthesis is compromised but so is neurotransmitter synthesis. And so being cognizant of adequate protein intake or even utilizing things like amino acid supplementation is a good idea if you want to support your neurotransmitters, that and the vitamin B complex would be the 2 most important building blocks to make sure that you have enough to go around.

Shawn Stevenson: Man, that is so good, so important. I don't think we think about that aspect.

Ben Greenfield: Probably because we don't have enough neurotransmitters.

Shawn Stevenson: Yeah, think about it. And again, I love the fact that you're emphasizing especially at night, which is when we tend to like you don't want to do a movie night of like "It" and then John Wick and then try to go to bed, you know what I mean? So give yourself the opportunity to wind down. Of course, there are situational

instances where you can watch a movie, watch a scary movie, but on a consistent basis being hyper-stimulated through things like, especially the things that we're watching which is just like that multidimensional your hearing, it's just it's affecting you with so many different ways before you go to bed.

Ben Greenfield: Yeah, and what kind of annoys me not to get negative in both the biohacking world and the western pop culture world is that we'll often do those type of things at night but then figure out a way to supplement our way out of them, like, "Oh, my cortisol is high because I decided I'm going to structure my life so I'm doing a HIIT work out an hour prior to bedtime, but it's okay, I'm going to take some Phosphatidylserine and these adaptogens to decrease my cortisol and then when I wake up in the morning I'm going to take my coffee and my smart drug to wake myself back up," and you put yourself on this upper downer roller coaster ride.

And for other people who are still using western medicine principles, for them it might be Ambien or Valium or something like that that allows them to shut themselves down because they just have not been cognizant of stimulus, they just are in there habitual routine of stopping by Starbucks on the way home from work, getting the workout in, finishing the workout, going home, having dinner but then rather than winding down after a family dinner, maybe playing some music and reading a book, it's downstairs to the basement to watch something exciting on Netflix and then turn on all those excitatory neurotransmitters all over again.

And so structuring your life in such a way that the more excitatory activities occur earlier in the day and the inhibitory activities occur later on in the day is I think a better strategy than the excitatory activities occurring later in the day and then filling your body with inhibitory chemicals so that you can sleep after that.

Shawn Stevenson: This reminds me, a few weeks ago I did a talk for some of the top executives in the country in this particular field, and one of the guys was asking a question, he was very serious, but he was open to sharing, talking about in the group everybody's having a good time and laughing, but he shared that every night he's taking like 40 times the amount of melatonin that's recommended, and just over the years he used more, more and more and also wine, most evenings.

And I'm just like, "Man, you were really putting yourself in there." Here's the

thing, I asked him about his routine, what is he doing, he watches TV in bed, right before he goes to bed every night. And he doesn't take the time, even from that, he goes right from work to getting in the bed watching television. And he is just like looking at the behaviors, like what are your rituals, what are your patterns in addressing those things rather than trying to supplement our way out of a situation?

Ben Greenfield: I have 2 thoughts about that. The first regarding melatonin, we know that the levels that you produce will decrease with age. I think there's something to be said as you age and this is testable using a urine test that same DUTCH test I talked about, you can test melatonin levels. If they are low, which is not uncommon after the age of 40, small amounts of melatonin intake can be helpful to assist with sleep at night. Larger doses of melatonin when you're crossing multiple time zones on the first night that you arrive at your destination can also be useful as a circadian rhythm reset.

And as a matter of fact, for example, I'll be flying to India in 2 weeks. When I travel internationally I travel with melatonin suppositories, there are 100 milligrams which is a lot of melatonin, but it like pushes the reboot button on my circadian rhythm when I get to where I'm going. I wouldn't do that every night but it's useful as a sometimes drug to help out.

And as you age smaller microdoses can be helpful. So I'm not totally against melatonin but I do think it's abused and in many cases overused in people who should be able to produce melatonin just fine, but are suppressing with evening light exposure and evening excitatory activities.

The second thing is that you talk about TV and sometimes computer work in bed and I know that you have a wonderful book on sleep, your "Sleep Smarter" book and you and many other good sleep scientists and authors they talk about sleep hygiene, and many people are aware of sleep hygiene being the light and temperature and noise.

And I think that one that's under-emphasized often is safety, meaning when you crawl into bed your body should consider that to be a safe, parasympathetic rest and digest place to be. The more that you can do to put yourself into a feeling of safety when you crawl into bed the better. This is one reason why, for example, gravity blankets are a wonderful tool for people who have difficulty sleeping because they almost smother you with 20 to 25 pounds of a breathable

cool material that can be very comforting for a lot of people.

For others it can be a dog in the bed, my wife loves to sleep with the dogs and sleeps wonderfully with the dogs when I'm traveling because she feels more safe. When you bring a laptop into bed that laptop is not inherently dangerous but because of the sympathetic nervous system response associate with work, because most people don't just entertain themselves with their computers, they also work on their computers, it sends your body a message that in that bed there something that simulates sympathetic nervous system activation.

So when I'm traveling even when I'm in the smallest of hotel rooms I used to you know just flop down on the hotel room when I need to do laptop work I just sit it on my belly during lunchtime or whatever and banging out some emails. My laptop is not allowed anywhere near the bed now because I want my brain to associate the bed with being a place of safety and not sympathetic nervous system activation. So you make a very good point.

And TV, I realize that is not necessarily something people associate with work, that's a different set of issues related to blue light suppressing melatonin production. But yeah, ultimately I think that making your bedroom as safe a place as possible is a very useful strategy for enhancing sleep.

Shawn Stevenson: So great, man. I want to talk about this really interesting phenomenon, a lot of folks know today it's become part of our lexicon, leaky gut. But we're looking at this new situation of, and this is due to this semi-permeable access that our food has into getting into our body, but we have this really interesting barrier in our brain, like the blood-brain barrier and you talk about so eloquently in the book, and how now we're looking at issues with not just leaky gut, but leaky brain. So let's talk about this, let's talk about the BBB and talk about this phenomenon of the leaky brain.

Ben Greenfield: Yeah. BBB, the blood-brain barrier. And, of course, many people are aware that if you are eating in a stressed-out state or you have gut damage brought on by something like exposure to herbicides and pesticides such as glyphosate, or you're consuming foods that you're allergic to, there can sometimes be an inflammatory response that results in damage the gut wall that allows undigested proteins to cross the barrier between the gut and the blood.

When those undigested proteins wind up in the blood your body can mount an

immune response against them with gluten probably being the most popular of the larger proteins that can cross that gut blood barrier. I'd don't necessarily have anything against gluten, I like pasta, I like bread, I'm not one of those gluten-free folks. But I think that if co consumed with glyphosate which induces a leaky gut wall that's a pretty potent one-two combo for some autoimmune issues, so it's more the glyphosate than the gluten I think.

However, the blood-brain barrier operates very similarly, a semi-permeable barrier between the blood and the brain that should in normal circumstance keep toxins, chemicals, larger proteins from crossing into the brain and if that barrier is compromised, you see impaired neural function, impaired sleep, impaired executive function, memory cognition etc.

Now, the 2 main things that would cause a leaky blood-brain barrier are chronic stress and lack of sleep, okay because it's going to be repaired during sleep and because stress will cause an inflammatory condition that can cause the blood-brain barrier to become leaky. There are other things I talk about in the book that contribute to it, large exposure to non native EMF for example, from 5G and wi-fi, the use of cell phones up by the head, there are other things that can contribute to chronic stress and lack of sleep would be the biggest.

The cool thing is that it can be repaired, there are things that you can do to repair the blood-brain barrier. Magnesium is one example, something that can be very helpful for that. So like taking magnesium before you go to bed, like magnesium glycinate is actually very, very good for the brain, for the blood-brain barrier.

Another example is this technology called pulsed electromagnetic field therapy. I was telling you I think before we begin recording that I get a massage and I have this mat that I lay on that delivers what's called PEMF and these PEMF frequencies are actually very good for the brain. The cool thing is if you don't have the ability to afford something like that outside the surface of the planet, that actually emits a naturally high level of PEMF, so you can get in a park or your backyard and you can just spend a little bit time laying on your back or even walking barefoot that's wonderful for the blood-brain barrier.

Coffee and tea, any of these high polyphenols, high flavanol type of compounds in moderation can be helpful for the blood-brain barrier. The alcohol in small doses can help, and ethanol, the more toxic component of wine and cocktails

and things like that can compromise the blood-brain barrier in high amounts but small, almost microdoses of alcohol like a glass of organic wine with dinner each night that can actually help it out.

Fatty acids, those are wonderful for the myelin sheath and the neurotransmitters I was talking about earlier. The propagation of nerve signals can also be very good for the blood-brain barrier with the two most notable I think especially for children and babies but for anyone who wants to care for their brain being one that's more popular DHA you know, such as you'd get from fish oil or krill oil or algae, for example. But the other one that flies under the radar a little bit more is linoleic or oleic acid that's about 30 percent of the sheaths that surround these nerves, these myelin sheaths.

And honestly, I guzzle extra virgin olive oil, I go through so much extroversion olive oil is just a potent pure source of oleic acid. If you're getting a good glass bottle you know translucent bottle with really good spicy polyphenol and flavanol-rich extra virgin olive oil, not the stuff that you find in a plastic bottle at Costco, or the stuff that they use at restaurants that they cut half and half with canola oil but good spicy extra virgin olive oil, it's one of the best things you can do for cognitive function, for nerve function, for that blood-brain barrier.

The chapter 2 of the book is literally pages and pages on how to heal the blood-brain barrier and what causes it to leak, but those are few of the important things to start with.

Shawn Stevenson: You have so many, and I love this because each section when we're talking about a particular issue you've got like 5, 10, 15 different things you can do for backed by data. One of the things you mentioned here with leaky brain you put a word of caution about super high-fat diets.

Ben Greenfield: Yeah, that was interesting to come across. I had a couple of research assistants, three actually helping you the book because we have over 3000 scientific references and it was definitely a team effort to be able to go through everything and scour through every study and then reference it all on the website that I made for each different chapter of the book.

But the interesting thing about the saturated fat, which is especially relevant when we're in an era where the ketogenic diet is so popular and people are putting loads of butter and coconut oil in their beverages tending to eat more

marbely cuts of meat and generally prioritizing saturated fats is that a high saturated fat diet in the absence of polyphenols and flavanols and fiber has been shown to be inflammatory to the gut and to the brain.

And so what this means is that if you're eating a ketogenic diet you'll be well served to eat a more plants rich ketogenic diet or to engage in ways to enhance ketone production that don't necessarily certainly involve high saturated fat intake. So perhaps you cut your total percentage of saturated fat down to a healthier intake which is generally about 8 to 10 percent of your total fat intake, and you replace that with things like intermittent fasting, fasting-mimicking diets, a fat such as monounsaturated fats like the extra virgin olive oil that I talked about.

And then also exercise would be another and these newer ketone salts or ketone esters that allow you to produce ketone bodies without relying largely upon the medium-chain triglycerides you might find in saturated fat. This is important also for a lot of people because many people have a gene called the FTO gene that predisposes them to weight gain and inflammation in response to high amounts of saturated fats.

And I know many people who follow a ketogenic diet or some variant of a high saturated fat diet, when I look at their blood tests they have high hsCRP and cytokines and homocysteine, the markers of inflammation that they shouldn't necessarily have and in large part that can be due not to the presence of vegetable oils or high amount of sugar, the other things that would normally produce that condition, but instead a genetic predisposition to inflammation in response to saturated fats.

And that's why I have yet to write a diet book. Because the diet that works for your neighbor is not necessarily going to be the diet that helps you too to lose 20 pounds and if they're following a ketogenic diet but you have a poor FTO gene response or you have Familial hypercholesterolemia or you have poor liver or gallbladder function due to the vagus nerve issues, then that ketogenic diet is going to screw you over, but it might be the perfect thing for your neighbor whereas you might you know something like a plant-rich diet that's got more of like a Mediterranean approach would be more appropriate in your case. So there's no one size fits all approach for diet.

Shawn Stevenson: Yeah man, I'm so glad that you said that. And this is something I saw in my

practice for years because when I started off I was like, "I'm doing this thing, you're doing this thing." And eventually, you know, of course, there is going to be a percentage of people who excel with that, but it would bother me the people who aren't getting the results and I had open myself up to understand that everybody is so unique.

And even the time in your life right now, a certain diet might have just crushed it for you 5 years ago, but now it's just "not working" and it's just having the audacity to experiment but also to test like you just mentioned. Paying attention like you mentioned the DUTCH test a couple of times, you can see what's going on with your neurotransmitters, your hormones, seeing what's going on with your blood work, you mentioned CRP and how important that is.

If a diet is creating more inflammation, even if it works for somebody else we have to pay attention to that, so thank you for bringing that up. But I really got to ask you about this, this is one of my favorite sections in the book— recovery enhancing tactics. And you talk about the ability to recover from just our standard training, recovering from travel, even recovering from injuries.

And one of the things you highlighted in multiple sections and especially in this part of the book, I really paid a little bit more attention to is cryotherapy. So let's talk about that in the context of healing, physical recovery.

Ben Greenfield: Yeah, cryotherapy is largely known for those chambers the people get into that when they step out of make them look like Han Solo in Star Wars when they opened his little coffin that he's been iced in. And most popular as a promise for accelerated fat loss and it is true that when you get cold you see an upregulation of what's called brown fat activity, the type of fat that uses calories to generate heat instead of ATP. And when white adipose tissue gets converted to brown fat you see a slight uptick in metabolic rate.

And so that can be useful for fat loss. And I wore continues blood glucose monitor for a year last year and found that the number one thing that kept blood glucose stabilized the entire day, no matter what kind of carbohydrates that I ate was in fact about 2 to 5 minutes of being very cold in the morning, such as a cold plunge, an ice bath, a very cold shower of cryotherapy.

And so there are metabolic benefits to the cold. We also know that it tones the vagus nerve like we talked about earlier, it's wonderful for nitric oxide

production, it can be useful as a sleep pack if you've done an exercise session late in the day and you need to bring the core temperature back down. But for recovery, you actually see a vasoconstrictive response that occurs in tissue that has localized cryotherapy or an ice pack placed over it or even a full-body anti-inflammatory response when the entire body is submerged in cold water or when you step into one of those cryotherapy chambers.

That vasoconstriction is followed once you warm back up by vasodilation and so you must get a pumping action of inflammatory bi-products out of the tissue. You can also combine localized cryotherapy and they even have units now, many of those places have cryotherapy chambers actually have localized cryotherapy where they use almost like a vacuum size canister to just blast an area that's been inflamed with cold and you get that vasoconstriction, vasodilation that helps to reduce inflammation and swelling.

Another way that you can use it is electrical muscle stimulation now is quite effective at healing injuries, placing electrodes around an area that's injured. And it turns out, I learned this from a doctor who works with Tour de France cyclists, he would help them heal their injuries faster during the stages of the tour. You put a topical anti-inflammatory such as arnica or magnesium or CBD or something like that on top of the muscle that's injured, then you put electrodes on top of that.

It is in the "Recovery" chapter of the book it's called "The 1,2,3 combo" all that stimulates the nerves, transcutaneous nerve stimulation, but electrical muscle stimulation stimulates muscles. So you want an electrical muscle stimulation unit. And what the electrical muscle stimulation does is it drives that anti-inflammatory topical lotion that you've applied deeper into the tissue so you get more targeted delivery.

And then if you put ice on top of that you're able to turn up the electrical muscle stimulation even higher because your pain tolerance is higher and that can accelerate recovery from soft tissue injuries very quickly, this combination of ice, electro stem and some kind of like a transdermal anti-inflammatory application. So the cold can be very useful.

There are anecdotal reports of people doing like very cold water swimming for a period of time, who had some pretty severe arthritic symptoms, an unexplained body pain what we call fibromyalgia in modern medicine and it completely

disappeared after series of very cold treatments.

So there are a lot of recovery benefits to the cold with the caveat being that cold is so anti-inflammatory that if you do it right after an exercise session and you do it in excess, typically 10 minutes or longer it blunts the hormetic response to exercise, meaning it blunts inflammation so effectively that it should be avoided for a couple of hours after exercise or used later in the day as a recovery strategy.

If you're using it to cool the body so that you can sleep better or so that you're not pitting out at work during the day, you can still do it but just like a brief for a like 2 to 5 minutes. Those longer cold water swims that should be something that you should not do right after workouts, the same reason you shouldn't take a lot of vitamin C or vitamin E after work out.

It's the same reason the diabetic drug metformin which is being used off label as a life-extending strategy but is also a potent anti-inflammatory should also be something that you do not take if you're an athlete or someone trying to gain appreciable amounts of muscle. But the cold can be a really useful tool. There are a lot of other ways that you can heal up the body that I talk about in the book, but cold is up there as one of the more potent strategies that you can use.

Shawn Stevenson: So what about the contrast?

Ben Greenfield: Hot/cold contrast therapy accelerates that vasoconstrictive, vasodilatory response that would be, for example, doing a sauna treatment and then going straight into the cold and then back into the sauna, into the cold, in the sauna, in the cold, and that's quite popular, you know. I have a sauna at home and a cold pool nearby, and I'll do that sometimes on a recovery day.

Another example would be hot tub to cold pool, to a hot tub to cold pool, back and forth, doing something like that. When I travel I actually take hot/cold contrast showers, 20 seconds of cold, 10 seconds of hot for about 5 minutes and the vasodilation, vasoconstriction it can be wonderful as like a cup of coffee for your brain, it can be great after a workout, it can be good for cooling the body prior to sleep. So yeah, there there are a lot of different ways to mess with cold but it can be very effective as a healing strategy for sure.

Shawn Stevenson: Man, it's so good. I want to ask you about so many things. In this section, you

also talk about hyperbaric oxygen therapy.

Ben Greenfield: Yes.

Shawn Stevenson: I immediately thought about Michael Jackson. I thought he was sleeping in one of those for a while.

Ben Greenfield: Yeah, he did.

Shawn Stevenson: But what's up with this? This is something I'm hearing so much more about, and I just look into the data recently and it's fascinating.

Ben Greenfield: Well, when you combine high levels of oxygen in the air that you're breathing with, and this is important, high pressure of the oxygen, so this is different than those oxygen bars you walk into where they hook up the little oxygen into your nose and breathe it in.

The problem is if your body isn't under pressure then the higher amounts of oxygen that you're breathing, the pressure is inadequate to actually allow that oxygen to dissociate in the muscle tissue or into neural tissue, but if you can pressurize the oxygen and also have high concentrations in the air then what you're gonna do is hyper oxygenate tissue which can be wonderful for healing, it can have a good cognitive effects, it can be wonderful for things like TBI or concussion or even that blood-brain barrier thing I was talking about for delivering more oxygen to neural tissue.

And now hyperbaric oxygen chambers are becoming something increasingly seen not just in medical settings but also in gyms, health clubs, recovery facilities, so-called biohacking facilities and even in homes. I recently got what's called a softshell hyperbaric chamber in my home, it's made by a company called HBOT USA and it's a home-based HBOT unit that actually gets up to a pretty high what's called PSI, it will get to about 1.4 PSI. I'm sorry, it gets to 4 PSI and that allows for pretty high pressure of oxygen that you can get inside and breathe when you're in one of those chambers.

On a medical setting it goes up to 1.6, 1.8, here actually, you can get into medical chambers you know, like I know, I was recently in Next Health a couple of days ago here in LA and they've got one of the big hard shell chambers that gets up to really high PSI, such a high PSI you have to be careful not to bring your phone

and paper and stuff in there because the last thing you'd want is a spark combined with that amount of oxygen because you would literally combust, so you need to be careful not to do it, not to a Deadpool inside the hyperbaric chamber. But the effects of that pressurized, concentrated oxygen is wonderful as a healing effect.

And for anyone who decides to mess around with this or to get a soft cell chamber for their home, when you combine that with breathwork because you're typically really focused on taking these deep inhales during breathwork, and I have even done 60-minute holotropic breathwork sessions inside of the HBOT chamber, and you literally just feel like your brain is saturated with oxygen, your head is clear as a bell after you finish something like that. And it's also been shown to be able to repair soft tissue injuries more readily. So there's a lot going for hyperbaric oxygen it's being used increasingly for both medicine and performance and recovery right now.

Shawn Stevenson: Man, again, so much good stuff. You talk about all this inside of the book, and so much more. And I've just got to have you back on again to talk more about this stuff, man, it's so fascinating, so many incredible tools that I just, I think that we don't realize we have access to, because stuff is going to happen in our lives, we are going to travel, we're going to get sick, we're going to have injuries, but also just if even things are going great there are things that we can do to help us to sustain or maybe to get a little bit better.

And you've got something for everybody inside of this book, it really is, you know, you got to choose your own adventure, dynamic to it but the funny thing is man, like you just, you don't want to miss anything in it. I thought I would jump to another chapter, but like, "Oh, this is too cool."

Ben Greenfield: I wanted it to be kind of a fun adventure for people and didn't want to be like a flash in the pin book you get through in a week and toss aside and as a result, it is kind of heavy, it's a little bit of a bonus that you get to work out when you're carrying it around.

Shawn Stevenson: Right, right, I told my wife I hand it to her I was like, "Be careful, make sure you've got a good grip."

Ben Greenfield: I've been signing it because I've been doing a lot of book signings, I swear, like my arms, because I pick up a book, sign it, pick up a book, sign it, I did it 100

times in a row, and yeah, I am getting my bicep curls in.

Shawn Stevenson: Man, it's also a beautiful book as well.

Ben Greenfield: Thanks.

Shawn Stevenson: You put a lot, man, you just put so much intention into it, you can really tell.

Ben Greenfield: Thanks man, thanks.

Shawn Stevenson: My pleasure, man. So thank you for putting this together for us. Can you let everybody know number one where to find the book?

Ben Greenfield: Oh it's very easy. If you have a bookstore near you they should have, email or call first if you're listening to this podcast when it comes out because everybody's selling out of it, which I just feel super blessed and grateful for that, it's a good problem to have. But BoundlessBook.com with the idea being that I want to equip people to have all the boundless energy they want at their beck and call all day long, so you have boundlessbook.com.

Shawn Stevenson: Awesome, man. One other thing I was pleasantly surprised that you also integrated things that are outside of the normal spectrum of very tangible health and fitness information and talking about like you said mind-body-spirit and we don't usually hear the spirit aspect tied into the equation.

So what was it for you, was this something that you were interested in a long time ago when you first got into the field? Because I know you've been a personal trainer for a long time, or is this something more reason for you to tie in these kind of metaphysical, spiritual aspects, even if you're talking about breathwork, you know, a lot of us think about meditation. Why was that such an important thing for you to put into the book as well?

Ben Greenfield: I think we're all on a path to enlightenment. Most humans are seeking purpose and fulfillment. And that drives many people happiness, ultimately. What makes me happy? Is it this cup of coffee, is it 6 pack abs? Is it getting my work out and that makes me feel happy most of the day and then I wake up unhappy the next morning and go work out again so I can get happy. Is it fitting into my swimsuit? Is it how I look on Instagram? Is it the satisfaction that I get from having a healthy diet, or even being able to memorize things quickly or play a musical

instrument because I'm taking care of my brain?

And increasingly, as I personally really optimize myself, like first with fitness, I became one of the fittest people on the planet and you know, it was racing Ironman for 20 years and doing bodybuilding for that and Spartan racing and collecting trophies and medals and podiums; that ultimately wasn't very fulfilling in the end, briefly, short term, then you want to sign up for the next race and figure out a way you could dominate again, or get that rush of dopamine again.

And then ultimately you realize it's not the path to happiness and neither is memorizing a deck of card or you know, playing a musical instrument or sleeping better. Those are all useful and they can serve you in life, but they're not a source of purpose and fulfillment.

We know there are super happy 110-year-old gin chugging, cigarette smoking grandmas in Sardinia Italy who are happy despite not doing all these biohacks and modern human optimization techniques. But they're surrounded by love, robust relationships, people who love them, often a strong spiritual life, a belief in a higher power and the hope that that can give one. They often have woven spiritual disciplines into their lives such as meditation, prayer, silence, solitude, fasting celebration, joy, worship, charity, service. And ultimately, nothing beats that when it comes to happiness and purpose and fulfillment.

And through my own life, I've discovered that for me to realize that that's where one derives true fulfillment in life, essentially what I tell my kids I really boil it down to 2 things— love God and love others. Love God and love others. And I would be remised not to share the enormous amounts of fulfillment and purpose and happiness that that has brought to me, especially as I've grown up, I've put on my big boy pants, I have become increasingly enlightened and I have realized over the past few years, "Jesus, how did I not know this for the past 20 years that you can wake with a smile on your face no matter where you're at, in the poorest of circumstances and still be happy if you have equipped yourself spiritually."

And so I think that that one thing, that one neglected shriveled up part inside many people in the world that we operate in, Shawn, the health and fitness world people are optimizing their bodies and they look good, and sometimes their brains are working great, their muscles look good, but their spirits, their

souls are just shriveled and shrunk up on the inside, they will never going to be happy, it's only temporary, they're never going to be fulfilled it's only temporary until they get to the point where they've optimized themselves spiritually and found the true happiness and purpose and fulfillment that that gives one. And so that's why I included that in the book too, because if you want to be boundless you have to have a boundless spirit, in addition to the boundless body and mind.

Shawn Stevenson: Man, I love it, man. Thank you so much. Ben, thank you for having the audacity to put a book like this together where you're not leaving any stone unturned and you're not missing any of the core components to being boundless. And mind-body-spirit, like you mentioned, and it's just been amazing to see you, to see your growth.

And to see the thing I admire most about you and that I tell other people about is the fact that you don't talk about stuff that you don't do, and you talk about a lot of stuff and you've done a lot of stuff, and to have the courage because that's what it really is, to experiment, to put yourself out there, when something's going good to have the cajones to say, "You know, I'm going to try something else."

And that's what I admire about you most because most people in this space don't have the courage to experiment like you do. And so you've got just incredible body of work and I can't wait to see what you do next and I want to make sure nobody picks up "Boundless" so go to boundlessbook.com, correct?

Ben Greenfield: Yeah.

Shawn Stevenson: And of course, check out your phenomenal podcast, we'll put that in the show notes. And where else can people connect with you?

Ben Greenfield: My website is Bengreenfieldfitness.com and I'm usually Ben Greenfield or Ben Greenfield fitness on most social media or you can just use the old Google, yeah, the old, evil Google. It is a discussion for another day, just google me you'll find me.

Shawn Stevenson: Awesome, thank you so much, brother.

Ben Greenfield: Yeah, cool. Thanks, man.

Shawn Stevenson: Everybody, thank you so much for hanging out with us today, I hope you got a lot of value out of this. Just nugget after nugget, and what Ben does, he gives you things for your superhero utility belt, like you think I've only got his boomerang, but boom, you've got like a freakin laser that shoots out, I don't know, roaches or something like crazy stuff, that you didn't even know you had access to, that can help you to perform freak other people out potentially.

But at the end of the day, man, we've got access today to so much, there's so much information that's out there, but what I love about a book like this is that we're taking not just somebody who's looked at the clinical evidence, but like anecdotally like putting the stuff into play in his own life and the people that he's worked with, together for us with answers, because there are so many different things out there for us to choose from, so many different things to believe, how can we find something that actually has efficacy?

And that's, again, what I really admire about the work and a big part of this, I think one of the big takeaways today and I hope you didn't miss this is the ketogenic diet is popping right now and for good reason, but it depends on you whether or not this is appropriate. And we can all get benefits, obviously, from having high-quality fats, we need them for sure, but that ratio for you might be a little bit different.

And understanding now we've got some data showing that extremely high-fat diet might be problematic for some folks, for your brain, that blood-brain barrier so this is one that, I think it's, we've got the microbiome, we've got the brain biome, and these are like the ultimate fronts, like the last frontier I think in health and fitness is what we're going to be looking at because it's everything, you know, your brain is determining everything about you, this is governing force determining how you feel, determining the digestion of your food, what hormones you are producing, how your metabolism is working.

We really want to take good care of our brain and him bringing up the topic of this leaky brain phenomenon that is just really, really starting to move to the forefront, super important, super simple actionable things for you to do in the book. And again, I think this book is something that is beautiful and it's something you can put on your coffee table and people can kind of thumb through and find cool things that they can implement immediately, but make sure to get yourself a copy of "Boundless" today.

And we've got some powerhouse, epic, boundless episodes 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 could find transcriptions, videos for each episode, and if you've 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 this 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.