THE MODEL HEALTH SHOW

EPISODE 523

Do These Things To Have More Energy During The Day & Sleep Better At Night

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. There's no doubt about it, the human brain is one of the most powerful objects in the known universe; it's a master regulator of our metabolism, of our immune system, and so much more. Even the beating of your heart is regulated by that amazing brain of yours.

And I felt that at this time in human history, it's a great opportunity, scratch that, priority, for us to focus on getting our brains healthier than ever. Since it's regulating so much, I felt that I needed to reach out to somebody who's truly an expert in the human brain. And that's who I have for you today. In fact, there was so much incredible information that I actually had to cut this up into two parts. It was just an absolute tidal wave of knowledge and practicality. So, we're going to talk about really simple clinically proven things that we can do starting today to dramatically improve that amazing brain of yours, especially during this time of stress, to build up your stress threshold, to build up your resiliency to stress so that you can continue to operate at a high level and not just survive this time of craziness, but to really thrive.

So really, really pumped about this. Now, one of the regulatory forces of not just our brains, but also our body overall, in particular, if we're talking about the health and resilience of our immune system, everybody knows his name, vitamin C. But I just came across a recent study that really took the understanding of this antioxidant nutrient to another level, because it's one of the most critical nutrients for helping our bodies to manage all the stress we're exposed to. This study published in the Journal of Nutrition and Food Sciences stated that both emotional and physical stress may affect a person's vitamin C status; it can increase the requirement for Vitamin C just to maintain normal blood levels when we're exposed to excessive mental and/or physical stress.

When stress depletes Vitamin C levels in the body, it reduces the body's resistance to infections and other diseases and increases the likelihood of further stress, so it becomes a compound effect. When vitamin C intake is increased, according to this recent study, the harmful effects of the stress hormones are reduced dramatically and the body's ability to cope with the stress response improves. Now, they detailed a couple of randomized control trials. One of them was a randomized placebo-controlled study carried out by researchers looking at marathon runners, and they were given vitamin C supplementation versus folks who received a tiny little sprinkling of vitamin C or a placebo receiving no additional Vitamin C.

And what they discovered was that the runners who received the high dose vitamin C supplementation recovered to normal cortisol levels more rapidly than those taking the

placebo and only receiving a fraction... A tiny fraction of Vitamin C. So, this is indicating that we need a robust amount of vitamin C because your body utilizes a lot of it from this physical demand. Alright, so that's the physical demand, now, what about our mental demand? What's one of the most stressful things in our reality as far as people doing a certain thing that causes a lot of stress?

Well, a lot of people would say that public speaking would be incredibly stressful, if not terrifying. So, the researchers actually took a look at a randomized double-blind placebo-controlled trial on stress of public speaking and concluded that those who received vitamin C supplementation experience less stage fright and showed a faster recovery of cortisol levels, indicating that the adrenal glands which of course, produce cortisol, were in fact now functioning in a healthier way, so we cannot negate how important Vitamin C is.

Alright, now here's the key. In looking at studies when we have synthetic versions of vitamin C versus whole-food botanical forms of vitamin C, it's not even close. Whole food-based concentrates of vitamin C far outperformed the synthetic versions, and this just makes sense because our DNA has interacted with whole-food versions of nutrients forever, throughout human evolution, versus the synthetic forms that oftentimes don't have the co-factors and the various forms of vitamin C, there isn't just one type of vitamin C, but when we get a synthetic version, it's hitting one note versus the botanical forms.

And this is why for myself personally and my family, I utilize the Essential C formula from Paleovalley. The biggest reason is that they have my all-time favorite botanical source of vitamin C Camu Camu berry, which is just a tiny amount, a teaspoon of Camu Camu berry provides about 700% of your recommended daily allowance for vitamin C. It's absolutely amazing. Plus, they have amla berry and acerola cherry. These are all my three favorite vitamins C dense superfoods that I've been utilizing for years, but now I've got it in one incredible complex and there's no binders, no fillers, it's organic, it's all done the right way, this is why I love them so much. Head 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. And you're going to get 15% off their amazing essential C complex, their Turmeric complex is amazing as well. Their snacks for the kids, for adults alike of course, phenomenal. I travel with their stuff all the time, go to PaleoValley.com/model. And now let's get to the Apple Podcast review of the week.

ITUNES REVIEW: Another five-star review titled “Shawn's a boss”, this pod is gold by Neutrodine. “Shawn dives deep, asks key questions, and walks the walk. This is one of the top health podcasts to tune into weekly.”

SHAWN STEVENSON: I love that, thank you so much for leaving that review over on Apple Podcast. I appreciate that. Truly, truly, truly thank you. And listen, like I said, this episode is so

packed with insight, and it's one of my favorite episodes of all time, I'll just tell you that right now, just being somebody who's a scientist and somebody who loves learning, and also being able to communicate these tools so that it becomes accessible to all of us. That's what I really love about it.

And so again, this is part one of this episode with the incredible Dr. Andrew Huberman. Andrew Huberman Ph.D. is 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 field 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 top journals including Nature, Science, and Cell, and has been featured in Time Magazine, the BBC, Scientific American, Discover, and other top media outlets. On this episode, we're going to be diving into upgrading our brain utilizing sunlight and the science on this is crazy. Also, surprising breathing techniques that instantaneously change our brain function and cognitive ability. So again, that's just scratching the surface on what we're going to dive into in this amazing conversation.

Part one with Dr. Andrew Huberman. This is a long time in the making. So many of my friends have been telling me about you and I've been diving into your world, and you are just blowing me away. I got to ask you because this is something that I haven't heard when I've been checking into your work, why the brain? What got you so fascinated with the human brain?

DR. ANDREW HUBERMAN: Yeah, well, first of all, it's great to be here and I'm an admirer of your work as well. So, the brain is super interesting to me because it's unlike any other organ in our body, and it is an organ, a brain, and I like to include brain, spinal cord, and nervous system, because basically they're all connected, and all the organs of the body are communicating back to the brain too. But the brain is really a unique organ because it can change itself, it's one of the few organs that, first of all, organizes the operations of all the other organs. So, a lot of people don't know this, but the reason that your heart beats the way that it does, the reason that you breathe the way that you do, the reason that your immune system turns on or off is because the nervous system tells it to.

It's an accelerator and a brake on all the systems of the body, but in addition to that, it can change itself so that it functions better. It has this property that we call neuroplasticity, which is literally the ability of the cells to change their connections so that the brain functions differently tomorrow or the next day than it currently does. And that is an incredible property because basically what it means is that you have an organ sitting in this hard skull thing of ours that can learn, and because it's in that hard skull, it doesn't have access to the outside world, as weird as this may seem, it doesn't really know anything about what's going on except what

the eyes and ears and nose and mouth, etcetera, tell us. And it takes that and makes good guesses about which ways it could change in order to function better. And to me, that just is a landscape that's both beautiful and mysterious, but also that is exciting enough that I can't help myself, but to work on it.

SHAWN STEVENSON: Yeah, yeah, so was it little Andrew that was fascinated with the brain, and where did that spark come from?

DR. ANDREW HUBERMAN: Yeah. There was an early life version of this, I think I was about six, I was six years old when I decided that I would work on the brain, but not because I understood what it was or how it worked, or what the mysteries were, but because basically my dad was a scientist and he was a physicist, and I said, "Well, I want to do that," 'cause most sons want to do what their dad does. I looked up to him and he said, "No, no, no, you don't want to work on physics because most of the basic problems there are worked out, you should work on something that is far less worked out," and I said, "Well, like what?"

And he said, "The brain." And I said, "Okay, well, I'm going to figure out how the brain works." And to be clear, I have not figured out how the brain works, and nobody has. But then there was a very long period of time in which I wasn't focused on school or biology, and it really was in college that I took a course from an amazing physiologist who study temperature regulation and hormone regulation and drug-seeking behavior and addiction, all that stuff. Got me really excited about experimental science, and I tripped and fell back into this question of how the nervous system works, and that's pretty much all I've been doing since I was 19. I'm 46 now and I've been just whole-heartedly obsessed with it.

SHAWN STEVENSON: That's amazing, that's amazing. And speaking of those different influences that you picked up from that teacher, I'm going to ask you about something that a lot of folks don't think about, and that is, we hear stress as being something that's kind of negative or it's bad for us, but in fact, stress is one of the most important things for healthy development of our brain. Let's talk about how stress is actually beneficial for our brains.

DR. ANDREW HUBERMAN: Yeah, great question. But I think we've all heard that stress can make us sick and that stress can kill us, and I think we need to be clear that stress can be both good for us or bad for us, depending on how long it lasts and how extreme that stress is. So, there are a couple of things I think we can all agree on. One is that trauma, intense fear, things of that sort, those are not good if we can avoid exposing children to those things, it's for the better. Fortunately, there are ways to rewire the brain to relieve trauma and extreme fear and phobias, that's a lot of what my lab works on. And of course, there are a lot of laboratories working on that. But we can say a few other things for sure, first of all, you can have stress without having trauma, you can have stress without having fear, but you can't really have

trauma and fear without stress. Right, and then anxiety is one that gets thrown around, people say I have anxiety, anxiety is sort of stress about the future, but I think we can set anxiety aside and really just talk about stress and say a couple of things.

First of all, stress includes the mind and the body, it involves a speeding up of the heart rate, speeding up of the breathing, our pupils actually dilate when we are stressed, and it changes, literally changes the way that we view our environment, it changes the optics, it tends to make our visual field narrower, so we get a tunnel or soda-straw view of the world. When we're relaxed, that aperture, that view of the world dilates and gets bigger literally, and that's because as we stress the lens of our eye moves, and there are changes in the structure of the eye, it's incredible.

Short-term stress, where we feel triggered by something or we wake up and we realize we didn't do something, that causes the very rapid release of this hormone called adrenaline and the equivalent chemical in the brain, just to confuse people, scientists decided to call the hormone in the body adrenaline, but the chemical in the brain, which is adrenaline, they call epinephrine, but they are the same thing. So it creates alertness of the mind and a kind of a hyper-focus on whatever is happening, so the troubling text message, the troubling news article, the troubling comment, whatever it happens to be, and our world shrinks and gets very focused and very intense because the adrenaline in our body tends to make us immediately alert, which is really incredible, if you think about it, these are powerful systems.

Now, that short-term stress, or I should say that stress provided it's in the short term is not necessarily bad, because one additional thing that adrenaline does is adrenaline and short-term stress causes the release of cells in the body that actively fight infection of all kinds: bacterial, viral, etcetera. And this makes sense, if it were truly the case that stress reduces the functioning of your immune system, well, then any time we had a challenge to our immune system, we would die. Right, that can't be the case. And it's actually the opposite.

So there are some really good data that are published in excellent peer-reviewed journals showing, for instance, that things like intense breathing or an intense episode of stress or a cold shower, all of which release adrenaline into our body, that's if you ever got too cold water, you're oh my goodness, and your eyes go wide and you're filled with adrenaline, that adrenaline response mobilizes the immune response in a way to prepare for whatever challenge is coming.

Now, if you've ever been stressed for a long period of time, you've been caring for a loved one, you've been challenged with work or financial things or family things, or mental anxiety that goes on and on, and then you finally rest, typically that's when you get sick because your system isn't up on guard. Now, this doesn't mean that we should seek out stress necessarily,

the real key is to be able to experience stress, but then to be able to shut off the stress response.

And earlier, you and I were talking about this, for instance, we have a stress hormone called cortisol, it is a healthy hormone provided it's released at its highest levels early in the day when we wake up, it is released and then tapers off and maybe throughout the day, you have a stressful text message, you see something online, you have these little spikes in stress, but provided they come down, that's fine, but when you start seeing peaks in cortisol toward night time, again, that's actually a signature of depression, that's a signature of sleep problems, that's a signature of metabolic disorders.

So, the real key is to accept stress as a reality, accept that stress is helpful in the short term, but learn to adopt practices that allow you to clamp down on stress when you feel like it's not serving you or it's been going on for too long. And those tools and the science behind those tools are a big part of what my laboratory at Stanford has been about, and what the work with my collaborators at Stanford has been about, is figuring out what can people do to control their stress. Because I think a lot of people just feel like stress is like getting thrown into the current of life, and you just have to wait until the current slows down, and that's absolutely not the case. There are things that we can all do that don't involve ingesting anything, taking anything at all that can help us reduce our stress levels.

SHAWN STEVENSON: That's so good, so powerful. So, when you're talking about that rhythm, you know, and this is something I'm fascinated with, and I know you are as well. Circadian medicine and looking at how our bodies are... We've all really synced up with the planet, the diurnal patterns, and the nocturnal patterns of life, and now today we can hide out in this room, for example, and try to ignore what's happening out there, but our systems are always trying to kind of sync up and having that exposure to sunlight in the morning is, which we were talking about at the beginning of the show, which we could definitely talk about now, helps to set the template for a healthy release of cortisol, serotonin production in the morning, which that's a precursor for melatonin, there's so much good stuff there, but what I would see early on in my career was people... We would call them tired and wired, where their cortisol seemed to be too low in the morning, too high in the evening, and wondering why they're not sleeping well. And cortisol, again, it's not that it's bad, it's just when it's produced, and the amounts, like that association I think it's...

I think one of the big issues today is that we tend put things in this black or white thing, stress bad. Cortisol bad. You know? This hulk smash kind of version when it's really just this cascade. And it’s really just kind of where it fits in our lives.

DR. ANDREW HUBERMAN: Yeah, as a general theme of human biology, the human body and mind are so incredible because it uses generic chemical signatures or chemical tools in order to respond to all sorts of things. Life is very different nowadays than it was even 10 years ago, or certainly 50 or 100 years ago. But remember that all the systems of the human body and mind, they've been around for a very long time, and the reason that we've gotten as far as we have and that I'm an optimist, that we are going to continue to progress as a species, is that these systems work really well to deal with challenges of different kinds, so we have a sort of a general system for mobilizing us, and that's what the stress system really is it gets us moving. That's why when we have a stressful episode, we tend to shake, our heart is beating, we tend to...

Our eyes go open, it's designed to move us, not necessarily just away from predators, you always hear that that stress is a carry-over from when we were hunted by lions and things like that. Look, I'm sure that's true, but I'd be willing to bet that 100 years ago, 1000 years ago, people still had financial challenges, relationship challenges, all sorts of challenges, so the stress system is there to respond to any of those. And we also have reward systems that are there to make us feel good about pursuing certain things and feel good about human bonding and things of that sort, so there's really only a basic handful of ingredients of chemicals inside of all of us that drive us toward or away from certain behaviors. You mentioned morning sunlight, and I think it's worth focusing on because if there were one set or even just one practice that can fundamentally change your ability to cope with stress and to sleep better, which as we know is the fundamental layer of health, of all kinds of health, it would be to view morning sunlight, ideally within 30 minutes, but certainly within 60 minutes of waking up.

This is a very simple practice that's anchored in a lot of biology, I know you've written about this before in your book, some people might already be aware of it, but it's quite simple, we can just list off what the practice is, it's basically get outside... Ideally, you don't do this through a window because of the way that windows filter out the light that you want to view, you get outside... If you can do it safely without sunglasses, don't wear sunglasses, on a clear day, maybe five, 10 minutes would be even better, on a cloudy day, 20-30 minutes, and if it's really overcast and you're in England in the middle of winter or something... Trust me, there's more light outside, even on that cloudy day than there is indoors with bright lights... Get outside for anywhere from 10 to 60 minutes early in the day, if you have to check your phone out there, do it, but ideally, you get outside, you get that sunlight exposure to your eyes, you don't have to look directly into the sun, because there's a lot of what we call photons, light energy around. Those photons, the light energy, and this sound very mystical, but it's not...

Literally, it's captured by neurons, nerve cells in the back of your eye, that signal is then sent to the master clock in your brain, sits right above the roof of your mouth, and that master clock sends out signals, chemical and electrical signals to all the cells of your body. All the cells

of your body have a 24-hour clock, and that is not a coincidence, it's timed to the rotation of the earth every 24 hours. So that basic behavior of going outside each morning, you can wear eyeglasses, you can wear contacts, and doing that for 10 to 60 minutes will fundamentally shift your well-being, it times your cortisol to the correct early part of the day, it tends to ensure that the cortisol bump won't happen later, so it can offset the symptoms of depression. It also set a timer, as you mentioned on the serotonin melatonin pathway, so that about 16 hours later you start getting sleepy, so you can fall asleep well. And on and on and on and on. The question I always get is, what if I wake up before the sun rises and you want to be awake, turn on as many lights as you can, and then when the sun comes out, go outside.

But this practice, it sets the foundation for your ability to cope with stress, it sets your capacity to deal with everything, and I could list off 20 or more positive changes and impacts that this creates. Some people find that just this one behavior leads to a very large positive effect on mood and ability to sleep. The other thing that I would tether to this is, if possible, and I do think it's possible unless you're doing shift work or something of that sort, really try and avoid viewing bright artificial lights of any color, not just blue light; screen lights, at home lights, dim those down, way, way down, or don't have them on at all, between the hours of about 10 PM and 4 AM. There's a study that was done by colleagues of mine at National Institutes of Mental Health and also at Brown University, showing that if we expose our eyes to even a little bit of light late in the day or at night, late in the day, meeting 10 PM to 4 AM, that actually can cause reductions in important chemicals that create a sense of well-being, like dopamine can create deficits in learning, can create more stress in the subsequent days. So, if you are not getting outside in the morning and getting sunlight and you're on your phone in the middle of the night, even if that phone is dimmed way down, you are setting yourself up for a very challenging situation.

Now, if you do wake up and you need to be on your phone for whatever reason, just dim it way, way down and try not to do it too long or too often, but those two practices, I think really can help anchor people and anchor their stress system, so that it's resilient and it can respond to things, but then it can turn off, otherwise, it's like being on a bumpy ride out to ocean, which if anyone's ever been on that sort of thing... It is really uncomfortable. There's no settling in. We always feel like we're, as you said, tired and wired or little things can kind of knock us over.

SHAWN STEVENSON: We're kind of living this residual hangover effect. We don't really realize it. So, this is such simple in it, this is a no cost. Yeah, it doesn't cost anything. It takes a little bit of discipline, I confess there are days that I wake up and the blinds are closed, 'cause I like to keep the room dark when I sleep and I immediately get on my phone, and I'm checking email and I'm doing this, and I think in 15 minutes I'll go outside, in 20 minutes...

DR. ANDREW HUBERMAN: There are days that I miss, if you miss a day, just jump right back on, you're not going to collapse all the good and positive benefits of these practices by missing one day, so you can hop right back on, and if you really, really want to black belt this process, you get some light in the morning, you also get some light in the afternoon before... Natural light before the sunsets, and then you avoid light in the middle of the night between 10 PM and 4 AM, or you dim it way, way down if you need to use lights for safety reasons or work reasons. If you do those three things, I would be very surprised if you didn't experience tremendous positive benefits, people's appetite tends to regulate.

They feel less jittery, they have fewer anxiety attacks, they feel less depressed, they feel more present, able to focus, they sleep better, all the things that then start an upward spiral, because when you're sleeping better then everything else gets easier when you're sleeping poorly, everything else gets harder. So, it's very straightforward, zero cost, it just takes a little bit of dedication to do it and you can make it a nice practice, you can take your coffee outside, you can take...

If you must, you can take your phone outside, although ideally, you would just going to breathe in your environment a little bit and look around as opposed to always being in a box about this big. And I should mention that when we are looking at our phone or any small space, we are essentially recreating that experience that stress and focus create of contracting our aperture, making our visual aperture like looking through a tunnel or a soda straw view, and that's a powerful positive thing when we want to be focused. It's our ability to engage in conversation and not get distracted, but if you are spending most of your time looking in a little tiny box about the size of your palm, you are pushing your system much harder than you would be otherwise. I think a lot of people forget this, so sometimes just walking to your car without looking at your phone, doing something where you're moving through space, walking, or even just driving and not focusing on this little itty-bitty box can provide a lot of mental relief and physical relief as well.

SHAWN STEVENSON: This is powerful. I didn't know he's going to bring this one up because I don't know if anybody's ever had the experience of being on their phone for an hour or two, and then feeling amazing after, just like... You know what I mean? It's just like something happens and you're sharing exactly what it is, our biochemistry is changing, we're getting into a stress state because of our focusing in on that one tiny space for that amount of time, plus not to mention all of the scanning and the scrolling and all the different brain candy that has there, so this is bringing to light one of the behind-the-scenes reasons why this is impacting our health... That's nuts.

DR. ANDREW HUBERMAN: The dark days and bright nights they say is a quick route to depression, anxiety, and... Or worse, there's a well-known phenomenon in hospitals called ICU

psychosis, so Intensive Care Unit psychosis, so people come into the hospital... These are people that are not suffering from psychosis of any kind, they might have a leg surgery or something, and many hospitals, unfortunately, have schedules and budget constraints that make it such that the lights are on at certain times, they're coming in, there's the sounds, there's a light all the time. And unless they are right next to a natural light window, people start developing psychotic symptoms, they start hearing voices, they start feeling really low then really kind of manic, they start having all sorts of agitation, when they leave and they get back onto a regular sunlight schedule, completely disappears. Now, people who already have existing psychotic symptoms, that's a different issue, but what this means is that we can all go crazy a little crazy, or a lot crazy with just changes in our lighting in our environment. And when we're looking at our phone all the time, obviously, it's not creating psychosis, but it is creating a kind of a low-level stress, and we have to remember that there's just one system, I mentioned the adrenaline from your adrenal glands, and the epinephrine in the brain, there's one general system for stress, you don't get to...

For instance, it's like a bank account, and so when every time you're looking at your phone, you're pushing your expenditure a little bit more, so then when something happens, you're less prepared for it. You're really less resilient. Now, of course, I use the phone. The phone is wonderful. We communicate. I frankly, I think there are some elements of social media, they're wonderful, you can learn on social media, I mean, you and I both teach you on social media, so I'd be a hypocrite if I said that the phone is bad. The phone is great, but it's just one way to interact with the world, and if you're spending too much time in that little tunnel, of which there're many things in that tunnel... [chuckle] If you're spending too much time in that tunnel, you will set up your biology to fail in the rest of life, I can confidently make that statement. So you have to control the number of hours and also just sometimes just knowing what's going on when you're feeling like you're scrolling and you don't even know what you're scrolling for, what are you expecting to see that it's suddenly going to seem that incredible.

So then again, there's some comedy specials that just came out on Netflix, and the other day I found myself on my phone for an hour, and this was time well spent, I felt... It made me laugh, I enjoyed it. That's time well spent. Communicating with people, that's time well spent, but we have to put that down and get back into life if we expect our biology to take care of us and for us to take care of it.

SHAWN STEVENSON: Yeah, these things sound very human, like when you were mentioning how many benefits we get simply from getting some early morning sunlight, it just seems kind of miraculous that you get this benefit, this benefit to this benefit, but these are things that our genes expect from us and it's amazing today we have to have these conversations and to kind of fortify what we evolve doing in the first place, but it's also fascinating, and the cool thing is, again, this is a no-cost intervention, and we can just bring a level of... I think a big

reason is... Our big problem is that we're not aware when we start to do these things, we get into the phone, and it's designed that way.

Part of the reason we keep scrolling is it's kind of like a little slot machine that's in our pocket, and we're... I think we're really designed, or our incredible design has us, to this place where we're sitting here today, we're kind of driven to seek out things and to explore and to find out and kind of that dopamine pathway even, and getting that little bit of a reward when we seek and we find, and we seek, and we find... And so being more aware that that's happening and then putting it in a proper perspective. I love that you said that it's not that it's bad, any of this stuff, it's just how we use it.

DR. ANDREW HUBERMAN: The desire to know what other people are doing and to communicate with them, that is a hard-wired aspect of who we are as a species, it's wonderful curiosity. We could look at scrolling on the phone and we can remove some judgment and say, it's... People are curious, they want to know what people are doing, and they want to know what's happening in other parts of the world, how exciting and important is that, and I think that... We don't want to demonize it at all.

You mentioned dopamine hits, dopamine is this molecule that really drives us to crave things and seek more of it. The problem is, if we are in a constant mode of seeking, it's well known now that the amount of dopamine that we release to any behavior starts to drop, and pretty soon we're doing that behavior, scrolling our phone, for instance, and we don't experience the pleasure, and this is starting to happen because we've had about 10-11 years where smartphones have really been prominent in society, and now people are scrolling reflexively. They're not really getting the dopamine hit anymore, they're not really experiencing much pleasure from it at all, and now the conversation is starting to shift toward the ways in which it's harming us. Now, unlike certain behaviors that are truly destructive for our health at the beginning, middle, and end, social media is here to stay, the phones are here to stay... I don't have a crystal ball, but I'm willing to bet that it's here to stay, people seem to like this social media thing, [chuckle] but it does have its issues.

And so, the real key is if you start dedicating a set number of minutes or hours per day that you're going to be on it, then what happens is you can continue to enjoy it, and I think we've overlooked at that part of the phones or bad conversation too, we meaning that as this is now starting to surface, kids are always on their phones, etcetera. Well, kids love their phones, my niece loves her phone, she gets talk to her friends, especially last year when everyone was separated and it was really hard on them, so I think that setting a certain amount of times that you can continue to enjoy the behavior, now it takes... Again, it takes some discipline. But one thing that can really help, I think, in providing a runway for people to adopt these behaviors in

particular sunlight viewing in the morning and avoiding some bright light exposure... Excuse me. Late in the evening and in the middle of the night, is if they understand...

If people understand that we all have cells in our body that were dedicated for this practice, we don't even have to go too far down the rabbit hole of mechanism, but we have specialized cells in our eyes that are waiting for that queue of what time of day it is in order to send it to that central clock that sits right above the roof of our mouth, which is a structure that is there for the specific purpose of informing the brain and body of when to be active and when to be asleep... And they have names, if people want to look them up, the melanopsin cells in the eye, suprachiasmatic nucleus in the hypothalamus, we can give them names, but the names are less important, I think than really understanding that they are there in you and me and everybody. Actually, even in blind people provided they still have eyes, who can't see, that are pattern blind, they still have the cells that can set these clock mechanisms and regulate sleep and wakefulness. Obviously, if they lose their entire eyes and then that's not the case, but it's so vital to understand that this is like a limb that we all have, and so of course, if we don't use it or we don't use it properly, we are going to start to suffer. So, I don't think anyone ever doubts that the fingers on their hands are here for a purpose.

Well, if you just keep your hand in a fist all the time or it's not going to feel good, and that's a very mild analogy, but once people start to understand, we have these things for a reason, and if we use them in these simple zero-cost ways, the rest of the things sort of domino into place, then I think there's more incentive for looking at those tools and for adopting those tools. And again, I get thousands of emails back and I didn't invent these mechanisms, I always say I was not consulted in the design phase, I did not create these mechanisms, they are there in all of us, but I get thousands of messages back and people saying how just by getting my morning light, taking my coffee outside, or sometimes people do with their family or with their pet, just by doing that they are sleeping better. And as I mentioned before, many, many other things improve.

SHAWN STEVENSON: Definitely, definitely, another little intervention here is like jet lag that can really help if you're traveling to do that practice, another thing that can help with that from Salk Institute, just shared this data, is a little bit of intermittent fasting.

DR. ANDREW HUBERMAN: Right.

SHAWN STEVENSON: Which this gives back to the conversation of stress, which I want to ask you about this actually having you here, a big part of stress, I believe is your perception of the stress, is your perception of what it is or what it's doing to you, whether you're aware of it or not. So, for us to become more resilient, for us to utilize stress for healthy development versus getting into the more dangerous aspects of stress, is the cold exposure, for example, is it

more... So, it's not just the thing, it's our perception of the thing, so what can we do to make ourselves more resilient to stress?

DR. ANDREW HUBERMAN: Okay, both excellent points. So, remind me to touch on intermittent fasting, that's the incredible work of my colleague, Satchin Panda at the Salk, terrific scientist, if people haven't read Circadian Code, I think that's a marvelous book, but we can touch on some of the highlights of intermittent fasting and why it helps with stress and many other things as well. But to your other question first, so if you think about the stress response, widening of the pupils, narrowing of the focus, elevated levels of energy in the body and adrenaline and all that. It's very similar to the response that we would call excitement, in fact, those are almost identical to get technical, if one wants just to look this up or something, they're both what we call increased autonomic arousal, the autonomic system is kind of like the how many RPMs you're idling at in your vehicle, right? So, are you idling high, or is it idling low? And so, things are ramped up. The difference between stress and happiness or stress and excitement is, on the one hand, is just cognitive, it's whether or not it was caused by something that we like or caused by something that we don't like, and that's really all it boils down to. The body doesn't have a separate system for alertness for stress versus happiness, it doesn't have that.

Now, there are chemicals like Dopamine and serotonin, and they get woven into the stuff that we like that are less present in our brain and body for something that we would call stressful, but if we were just to think about how to reframe our relationship to stress that actually can be done. I have a colleague at Stanford, he's the associate chair of psychiatry. He's an MD, he is a wonderful guy, and I'm mentioning him, his name is David Spiegel, because I'm about to quote him in my professional attribution, it's very important, but he has this great saying, which is, "It's not just about stress, it's about how you got into that state of stress and whether or not you had anything to do with it." So, the difference between a terrible event in the world that stresses me out, and for instance of me choosing to go take a cold shower deliberately, is that, in the one case, I actually chose the cold shower. Now, I might not like it. I might have to force myself to do it, but there does seem to be some mechanism that we're not quite sure how this mechanism works, but David's lab and my lab is trying to figure this out.

There's some mechanism by which when we choose to put ourselves into these moments of challenge where we are really elevated and we're having all the classic symptoms of stress, that it flips the relationship to one of a positive association, and that has two really important effects. First of all, you get the adrenaline response, you get the boost in the immune, that's been shown with that boost. And the adrenaline causes a boost in the immune system function, alertness. There's also a well-known now, well-established effect, meaning in the scientific literature that you get along and sustained increase in dopamine from cold water exposure, that even a cold shower just for a few minutes in the morning, and yes, you can turn

the hot water on afterward there's no law that says that you can't do that, which is a great relief to me. So, you turn the cold shower on, it's stressful, it's stressful, you're forcing yourself to do it, and then most people find that they feel...

All of a sudden, it's like, "I actually kind of like that." What is that about? Some people always hate it, but they do it anyway, and then you turn that warm water on if you're like me. You've just created a dopamine release, you just thrown in this feel-good molecule on top of the stress response, and you chose it. So that's one benefit, which is that you're enhancing your overall system in terms of your immune system, your feelings of well-being, but the other benefit is that then when something happens in the external world and you feel stressed out because of it, you recognize that state. You recognize, "Oh, this is me feeling really alert, this is me feeling... And I've been here before." It's sort of like if you ever... I haven't done this, but I've always wanted to do this. If you ever go to the track and you drive at 120 miles an hour around the track, that's very different than careening down a hill with no breaks at 120 miles an hour. Now, God forbid, I hope nobody ever has to careen down a hill with no breaks at 120 miles an hour, but God forbid, if you were in that situation, you would recognize that situation if you've been at 120 miles an hour before by choice.

And I would be willing to bet your outcomes are likely to be better as opposed to feeling like you've never been in that state. So, what's really disruptive about stress is that we don't pick the stressful event, that's why we call it stress. It knocks us off course, but a lot of what my lab has been focused on is trying to figure out what are the things that can allow people to capture themselves when in a state of stress, calm themselves down a bit, that's one thing, and we can talk about a tool that anyone can use, a zero-cost tool to do that. But the other thing is, how do you raise your threshold for stress? We hear about resilience and grit and mental toughness, and we have these amazing examples on social media and in the world and throughout history, but what hasn't really been explained or explored until recently is how do we create a more resilient self?

So, if I may, there are two tools that you can use to push back on stress, let's think about the first one as kind of a stepping on the break when you feel like you're just too stressed. And there are a lot of ways to do that, you can take a vacation, which is not very practical in the moment, especially if you're dealing with kids or life or anything, and you can't step out of life, you can do exercise, you can meditate, but those things require that you step out of the event. And much of life is about dealing with things as they come and not being able to leave the room, not being able to just quit your job because you don't like it, and so the tool that my lab has been focused on quite a lot is something that we call the Physiological Sigh.

So Physiological Sighs were described as long as ago as the 1930s. And actually, you do them every night while you're in sleep, and animals do them in particular dogs right before they go

down for a nap. It's a double inhale followed by a long exhale. The animal lovers out there will learn to recognize this, or you can look for it in your pets. In sleep, whenever we have a build-up of what's called carbon dioxide in our body, it's a stress, we're actually triggered to breathe by an increase in this gas called carbon dioxide. You don't have to know much about carbon dioxide, but what you need to know is that any time that carbon dioxide gets too high, we do in sleep, we do a double inhale, followed by a long exhale. Animals do this right before they go down to sleep. Now, it turns out that you can do Physiological Sighs deliberately in waking. If you're feeling too stressed, it's a double inhale through the nose, so it's followed by a very long exhale. Now, the second inhale is just a tiny one, you can barely sneak in any air you'll find 'cause it's a big inhale and then another little, tiny one. That little, tiny inhale, though, is important because our lungs are not just two big bags of air, they have little, tiny sacs called alveoli of the lungs.

And when we get stressed, those alveoli of the lungs collapse like empty balloons. And that second inhale re-inflates them so that when we exhale, we exhale all our carbon dioxide. And a lot of the stress responses are due to, and too much carbon dioxide. So, to make this very simple, if you're feeling too stressed do a double inhale through the nose followed by a long exhale, and chances are just one of those, but maybe repeating that two or three times, but chances are just one of those will immediately bring you back down to a very calm baseline. As far as I know, this is the fastest way to calm your system when you're feeling stressed. And the beauty of it is, you can do it almost any time unless you're completely submerged in water. The other great thing about it is that if you do it repeatedly, meaning as you move through life and you have stressful events and you do this Physiological Sigh, your system starts to react more robustly to the Physiological Sigh. It starts to calm you even faster and further, so much so that I know people who can't do too many of these or they get sleepy. It actually starts to put them to sleep. And it's actually a tool that some people use to calm themselves before sleep, they'll do...

And they'll repeat that. And we have a study that's now out for review, so it's not quite done, but where people do this as a regular pattern of breathing, but it... So that's kind of like slamming on the break. Again, zero cost. You can do it any time, any place. Some people might say, "Well, I have a deviated septum, or I have trouble breathing through my nose, I can't breathe through my nose." If you need to do it through your mouth, you can, but ideally, the inhales are through your mouth and the long exhale... Oh, excuse me, the inhales are through your nose and the long exhales are through the mouth. Now, that's calming down, but in order to raise your stress threshold to become more resilient, more gritty, you're able to handle life better, there is a practice that you can use.

One is the one that we talked about before, get into a cold shower once a day for one to three minutes. It never feels good. I always say the first, it's always like climbing over a wall, that first

wall is always there. I wish I could give you a tool that would allow you to enjoy it on impact, but a cold shower, you'll know if it's how cold because it'll be really cold, and you'll want to move away from it. One to three minutes of that and then turn on the warm water, and it will liberate the dopamine and adrenaline into your system. It will make you more resilient for stress that comes. And I guess it's not completely zero cost, but it's certainly cheaper than hot water, and most people, fortunately, have access to cold water. If you want to do ice baths, and buy ice and that kind of thing, that's actually kind of expensive.

It's like to really fill an ice bath, it's about $50 an ice, that starts... If you're going to do it regularly, that's a lot, so just cold shower is fine. You don't need cryo, to go to a cryo device. If you have access to one, great, but that will release adrenaline. And the other one is if you don't have access to cold water, you can try a different pattern of breathing, which is... We call it cyclic hyperventilation in the lab, but the other way to get adrenaline going into your system is to breathe as if you were really in a panic attack. And I just want to warn people who have panic attacks or who have a predisposition for really bad anxiety, probably shouldn't do this. But never do this near water, no matter who you are, but basically, you breathe in and out deeply for 25 breaths, I won't do it that all right now, but it's... You'll immediately start to feel warm. You'll start to feel agitated; you can notice my eyes are a little wider than they were a few seconds ago, that's adrenaline, you're releasing adrenaline. Then exhale all your air and sit calmly with all that adrenaline in your system. What are you doing? You're learning to be calm when you have a lot of adrenaline in your system, this is a self-driven stress inoculation.

And just to put a bow on this, this goes back to my colleague, David Spiegel's comment, "It's not just about stress, it's how you got there and whether or not you had anything to do with it." And so, these are tools that you can do. You don't even have to do them every day. The intense breathing, 25 breaths followed by an exhale and hold, you could repeat it if you want a few times. Don't hold your breath to see how long you can hold your breath just when you feel the impulse to breathe, breathe. But many people report feeling really pleasantly calm despite being really alert, so it's great to do if you have to lean into life. And the incredible thing about this is that it really does shift your biology so that when stressful events come, you feel more resilient and prepared. You will notice, "I can deal with things better." But you do have to do this practice probably one to three times a week. You don't have to do it every day.

SHAWN STEVENSON: Yeah. This is amazing.

DR. ANDREW HUBERMAN: Yeah. Sorry for the monologue, but I want to make sure that people got all the information.

SHAWN STEVENSON: But this is so amazing.

DR. ANDREW HUBERMAN: And again, I don't think we've talked about a single tool that requires a purchase or a potion. And this is not mystical, there's no... I don't have anything against mystical practices, but this is... There's no obligation to focus on your third eye center or to ground yourself with the... If you want to do all that stuff, great, but this is physiology. This is the hardware that we were installed with. And when you start tapping into that hardware, what I can also promise, is there are all sorts of gifts that arrive. People talk about having insights, people talk about a problem that they couldn't work out or a relationship issue they couldn't work out, insights start to come because you're literally shifting your state of mind and you're able to see things from a different perspective. And I always like to say that "It's very hard to control the mind with the mind." This is a beautiful organ, this brain thing in all of us, but it's hard to control, but what we're talking about using your body to control your mind. So, when you can't control your mind, you really want to intervene using these... What are really bodily functions, breathing, vision, and these kinds of things?

SHAWN STEVENSON: I love that you brought up the mysticism side because that's where a lot of these practices even come from, with the chaotic breathing or the breath of fire, but to put a description behind it, I'm really enjoying this because I've been doing that practice almost every day for about...

DR. ANDREW HUBERMAN: Which one, the deep breathing followed by breath holds?

SHAWN STEVENSON: Yes. For about 15 years.

DR. ANDREW HUBERMAN: Oh, wow. What time of day do you do it?

SHAWN STEVENSON: Within the first hour, so probably about an hour after I get up in the morning.

DR. ANDREW HUBERMAN: And you do it every day.

SHAWN STEVENSON: So, I do the chaotic breathing, and I'll do that for... It depends on the day, but there were times where I'll do it for several minutes, but now even just doing it, doing maybe 90 of those, you feel it, the state change, but then you just sit and relax into it. And again, one of those reasons why I don't respond to stress like I used to or other people, and for you to put a description behind why that is... Of course, I know that the practice is doing all these wonderful things for my nervous system, my brain, but really why I've implemented that practice so long is because of the sense of focus and clarity and being able to... If I'm trying to figure something out or visualize, I find that I solve a lot of problems, not trying to solve the problem, but just doing these practices. So that's so powerful. And again, this is accessible for everybody. And I love that you mentioned we want to have some consistency here. It doesn't

have to be every day. And if you miss a day, no big deal, but having some modality of consistency here, so as you mentioned, maybe three times a week, a couple of times.

DR. ANDREW HUBERMAN: Yeah. Maybe do it for two days, then you miss a day. There's no rule that says that you have to use these things every day. Neuroplasticity, the nervous system's ability to change itself in response to experience, it responds that process is engaged by the intensity of something. So, if you really... I'd rather see people dedicate themselves to this practice once a week and really focus on it, not scrolling their phone while they're doing it. Just setting aside literally three minutes to do this practice, or when they're feeling stressed to say, "Oh wait, I can stomp on the break of stress with this double inhale, long exhale through the mouth."

I'd rather see them do that once a week than kind of just do it 50% devotion and at multiple times per week because neuroplasticity happens when you focus on something and you really engage in that practice, then the nervous system rewires. And ideally, you don't have to do these practices all the time because you're not stressed as often, that's really the... That's the Holy Grail of all this. Now, I don't think anyone ever gets to a place where there's no stress in their life, and I think it just... I don't even know that that would be healthy for us. We are a species that responds to and often responds well to challenge over time.

SHAWN STEVENSON: It's how we grow.

DR. ANDREW HUBERMAN: It's how we grow, and I think that leaning... I would say I like to ask myself at any moment, "Do I feel like I'm back on my heels flat-footed or forward center of mass." Forward center of mass really meaning really feeling like I can get after it. Flat-footed is like, "I'm okay." You know, we're back on my heels, it's like, "This happens to me, I'm human." Sleep-deprived or ruminating on something too much or not really making progress in the way that I'd like." These are tools that allow us to adjust that balance forward. Forward flat-footed or back. And what's I think most useful about these sorts of practices is that you're not reaching to some external thing in order to solve the problem.

Now, of course, social connection is great, and I enjoy food as much as anybody, and I enjoy exercise, I enjoy various things, entertainment. But when you start taking control of your internal landscape in this way, that is extremely empowering because it's a whole different business to be able to understand, even if you're trapped on a plane sitting on the runway, I've had this happen, and I'm feeling just... I'm stressed just thinking about it. You've been flying all day, you finally arrive, and you can't get off the plane or for example, you have to manage yourself there. And if you can take yourself out of a stressed episode, and yes, I have done this sort of breathing on the plane, and I'll usually tell that person next to me if I'm going to do the deep breathing, "I'll just have this breathing practice that I do, don't worry." And I'll do it, 'cause

it does look a little strange to do the deep breathing practice. But the double inhales, that long exhale can be done anywhere, any time, it's pretty covert. Most people won't know that you're doing it, and that's powerful because you're learning how to drive the vehicle that is you.

SHAWN STEVENSON: Yeah, that's awesome. I'm just picturing you on the plane and me sitting next to you like, "Okay guy, go for it."

DR. ANDREW HUBERMAN: You had to warn the person next to you, but I've seen stranger things on planes.

SHAWN STEVENSON: Of course.

DR. ANDREW HUBERMAN: But I'll usually say something like, "I'm a scientist, and so I do this thing every once in a while, where I measure my heart rate" I'll sort of say something first, but one of these days I should just do it. I should just jump in and start doing the breathing.

SHAWN STEVENSON: That's awesome, but I love when you mentioned, and this is such a powerful insight that you chose it, just that simple thing, and I'm grateful that you're looking into it more to find out what is behind this, because it's a different scenario when you're choosing to turn on that cold water versus, you didn't pay the hot water bill, and you're in this scenario.

DR. ANDREW HUBERMAN: Yeah. So that's a good example, yeah. So, we have an area of our brain called the prefrontal cortex, and it's much of what makes us human. It's the thing that gives us an understand... It allows us to put context onto our own biology. It allows us to say, "Oh, my heart rate is speeding up because I'm excited that my favorite team might win this game." As opposed to, "Because I think there might be an intruder in my home." It creates context. Normally, we let it make those interpretations reflexively, but we have the capacity to decide that something is good for us. Maybe it's not going to feel good at first, but maybe some guy on your podcast, on The Model Health podcast told me that it was useful, so I'm going to explore it so that curiosity can be superimposed on the experience.

And look, I can't make the cold water not feel cold. I can't do that for you. No one can do that for you, but you can make the cold water experience a choice and you can make it serve you, not just in the immediate experience. But as I mentioned, there's a two... Or maybe I didn't mention this but getting into that cold water for one to three minutes leads to a 2.5 times increase in the amount of dopamine, this feel-good molecule, and then that lasts several hours. And it's not a level of dopamine that's so high or so sustained that it's going to be detrimental. You're going to feel really, really good for a while after getting out, and that's a promise. I can't tell you you're going to like the experience of being in cold water. I can't tell you that you're

going to like the experience of doing the deep breathing, but most people find that if they do it once or twice that they do, they start craving it because they are craving the dopamine release that comes from it afterward. And that's to say, and that's not even mentioning all the other positive effects, like improved circulation, deep breathing of any kind is a lot like exercise.

I wouldn't want to see people abandon exercise for deep breathing, but there are some interesting studies that are happening now of people that are paraplegic or even quadriplegic, trying to use deep breathing as a way to generate healthy circulation in the body and to get some of the enhanced mental benefits that come with more standard forms of exercise. So, if you're chair-ridden for whatever reason, if you can't exercise, maybe you're suffering an injury or something, for whatever reason, the deep breathing is a pretty good substitute, at least in the short term.

SHAWN STEVENSON: That's remarkable. We've got a quick break coming up, we'll be right back. Few people know that regularly drinking coffee has been shown to help prevent cognitive decline and reduce the risk of developing Alzheimer's and Parkinson's disease. This attribute referenced in the Journal Practical Neurology, is yet another reason why intelligent coffee consumption makes the list of best neuro-nutritious beverages. Another study, featured in the Journal Psychopharmacology, uncovered that drinking coffee has some remarkable benefits on mental performance. The researchers found that intelligent coffee intake leads to improvements in alertness, improve reaction times, and enhanced performance on cognitive vigilance tasks, and tasks that involves deep concentration. Now, why am I stressing intelligent coffee intake? This means acknowledging the true U-shaped curve of benefits and not going ham on caffeine. The data clearly shows that some coffee a cup or 2 a day and the accompanied caffeine is a great adjunct for improved mental performance. But going too far, starts to lead to diminishing returns. So, we want to make sure that we're getting an optimal intake of coffee, and again, not going overboard. And also, coffee is best when it's not coming along with pesticides, herbicides, rodenticides, fungicides, these chemical elements are clinically proven to destroy our microbiome terrane. So, destroying the very microbiome that helps to regulate our metabolism, regulate our immune system, the list goes on and on. Obviously, you want to make sure that those things are not coming along with the high-quality coffee that we're trying to get these benefits from. And also, what if we can up level the longevity and neurological benefits of the coffee by combining it with another clinically proven nutrient source. Well, that's what I do every day when I have the organic coffee combined with the dual extracted mushrooms from four sigmatic. And if we are talking about optimal cognitive performance and the health of our brain, the protection of our brain, there are few nutrient sources like lion's mane medicinal mushroom that pack this kind of benefits. Researchers at the University of Malaya, found that lions mane has neuroprotective effects, literally being able to help to defend the brain against even traumatic brain injuries. It just makes the brain

more healthy and robust. So again, this combination of medicinal mushrooms plus organic high-quality coffee is a match made in nutrient heaven. Go to foursigmatic.com/model, that's F-O-U-R-S-I-G-M-A-T-I-C.com/model, you get 10% off their incredible mushroom elixirs, mushroom hot cocoas, and mushroom coffees. Again, that's foursigmatic.com/model and now back to the show.

So I want to ask you about our approach to these things just a little bit more because I think that this is similar when you mentioned you enjoy working out, for example, and I'm thinking about people's perception of lifting weights, some people perceive it as extremely painful, they hate it, it's just like, I don't perceive it like that, it's kind of joyous, it's just a... It's a... The way that I experience it is just like I want more of it, bringing that same mindset what about with the cold exposure where I'm not just like, "Oh my God, this is going to kill me," or, "This is... I hate this." Or whatever it is, just maintaining a sense of calm or perceiving it as something that is enjoyable, for example, I know it's kind of hard to do with that example, but what about our building that stress threshold, if you understand where I'm going with this, what about our perception in that moment if we can relax into a little bit more, is that going to help us to adjust to stress when life hits us with that stress?

DR. ANDREW HUBERMAN: Yeah, it's a great question. It's actually the important question. I also like exercising. I do, I don't know why, but I just... I like it. What's hard for me is being stuck behind a desk all day and folded up along an accordion shape, and... That's unpleasant to me. I do like exercise, but I understand that some people don't. My sister hates the cold-water thing, I've managed to get her up to her shins so far, and then she's like, "I'm done," and I have to respect the fact that for people like her, some people just don't want to do it, they just don't want to do it. It's unpleasant. So, she does other things to manage her stress and has adopted practices. The mindset piece is really key, so let's take the cold-water example, because cold water is universal, nobody escapes the sensation of cold when they're in cold water, so I think there are really two approaches.

One is to try and relax your mind and your body while you are in the stress, that's one approach. The other is actually to lean into the stress, and this is something that our lab is working on, but it's hard to parse because it's very subjective, we can't really measure what people are thinking very well, even if we were to do brain imaging, it's hard to do, but I'm intrigued by this, so it's a little bit like... For those of you that have your driver's license, you'll know what I'm talking about. If you've ever driven on a gravel road, there's a speed at which the dust is kicking up and it's in your field of view and you're just probably going too slow. In that case, you speed up and you get the dust cloud behind you, however, if you go too fast, you start to slip out. So, I feel like the cold water, the best analogy I can provide, it's a little bit like a gravel road, sometimes it's better to speed up and to lean into it to really...

Like, I'm going to muscle through this, I'm going to get to that three-minute mark, no matter what, what you're doing is you're actually adding adrenaline to meet the challenge, which is one of the fundamental reasons we have adrenaline is to mobilize us and to allow us to meet challenges, so that's one way to approach it. The other way to approach it is to stay very calm and to try and relax into it so that you are kind of stair-casing up the adrenaline response, you're taking more control. Here's what I recommend. It's very hard to predict how the cold is going to trigger your mind, you always know how it's going to trigger your body, you're going to kind of brace, you're going to go, okay, I have to relax, I have to kind of stretch into this, so physically, you just always want to try and relax into the experience, but mentally, I suggest that people try it both ways. Some days you'll get in and you might just want to grit your teeth and think this is... I'm doing this 'cause I was... Told myself I would, or I really want to, and just really leaning into it, just like full rock and roll, just really into it, and other days try and be as peaceful and as zen as you can.

And I think you will know within the first 10 seconds whether or not you want to flip to the other approach. And I suggest whichever approach you pick, to try and stay with that for about 10, but ideally 30 seconds, and then you will think, oh, I can actually just relax through this full three minutes, or some days you'll get in and you'll try and relax, you'll be like, I can't do this, I really want to jump out, you'll notice that impulse to get out. That's when I would say, you know what, hit the gas, lean into this stressful experience, and then as you get out of it, just reward yourself mentally for having done it at all, and then it accuses at a point at which I'd be remiss if I didn't make... Which is that... We've talked about rewards and dopamine rewards, if you want a practice of any kind to feel good or exercise to feel good, if you don't already like it, subjectively rewarding yourself for doing it just mentally is very powerful. These four brain influences, these four brain neurons that we have will allow us to reshape our relationship to events, and this is the reason why new parents can maintain grueling schedules of child-rearing because they're telling themselves, this is important, those subjective things matter.

When they see their kids flourish as a consequence of their own sleepless night, they... When they see their child growing, they... This is a reinforcing thing. And so, we can override a lot of our discomfort just through thought, and I don't want people to place themselves into extreme discomfort, but when you push yourself into a practice, when you feel really, really challenged, making it through the cold water, when you force yourself to do the breathing exercise, you are in a position to get more of a reward from it than less. Meaning... It's sort of like this, if you have to raise the temperature a lot in order to achieve a certain level of comfort, that's a lot harder, but the way that the nervous system works is you get more of a chemical reward from going from zero to 60 than you do from going from 40 miles an hour to 60 miles an hour, it's just the way that the system works. If something's easy for you, there's no reason for your brain to reward it and there's no reason for your system to rewire. Remember rewiring neural... Of your system so that these things feel good over time, or they feel easier to engage in, that's

really triggered by how much of an intense stimulus it was. So, the more intense it is, the harder it is to drag yourself to these things, the more you're in a position to actually benefit from them. So, it's kind of counter-intuitive. But if you think about it, it makes sense too.

SHAWN STEVENSON: Yeah, of course, this is a perfect segue to asking about the strength training side, for example, training our bodies, and I'm fascinated with this because there's so many different ways that we are impacting our brains through our bodies, is there any science or any truth behind the statement that making your body physically stronger is going to make your brain stronger?

DR. ANDREW HUBERMAN: Well, let's see. So, there's the health, there's just the pure health and longevity side, so I can fire off a couple of quick, well-substantiated bullet points, this is isn't work that my lab's done, but I'm aware of work. It's very clear that cardiovascular exercise and not weight training, but something where you're breathing relatively hard and your heart's beating... Elevated heart rate, doesn't have to be high-intensity training, in fact, we're probably talking more about what people would consider zone two cardio, so where you have to struggle to hold a conversation but you're not completely out of breath, it's very clear that 150 minutes to 180 minutes a week of that is tremendously beneficial for cardiovascular health, for longevity, for brain function, for cognitive function, offsetting age-related cognitive decline.

We should all be doing this, and I confess the cardiovascular work is usually the last thing that I go to on a busy week, but it's something that I really enjoy once I start doing it, or once I've done it. But if you think about 150-180 minutes a week, it's not a trivial amount, it's an investment, but it's worth it. You're going to live longer; you're going to maintain your brain function longer and you're going to feel better... I mean, everything is going to be better. Now, on the strength side, there are fewer studies of resistance training; however, if you look at brain function and longevity, it's very clear that the body is informing the brain about the status of your entire being, and I truly mean that in the non-mystical sense. When we do load-bearing exercise of any kind, could even be air squats for some people, but if they're doing any kind of resistance training with weights or machines or bodyweight, there are actually hormones that are secreted from our bones, this is wild, this thing's called osteonectin is an example of one, that are secreted, they go to the brain, that enhance the survival and the function of neurons, of nerve cells in the brain.

And at first, when I heard this, I thought, this is crazy, the bones are making hormones, but it makes perfect sense. The skeleton is a very important system in our body, how do the areas of the brain that control movement, how do the areas of the brain that control learning, how do they know whether or not you are still moving or not, and... Well, they could know because your heart is beating, but maybe your heart's beating really fast because you're stressed out

about something. The only way that your brain knows that your body is being used and that your brain needs to continue to adapt and to stay strong, is if you're increasing the load on your skeleton. And if you look at cognitive decline and loss of memory and things over time, and you look at bodily function and the loss of certain functions, what you find is that there are these weird things that are correlated with brain longevity and some of them include, for instance, the ability to jump and land. I was talking to my... My mother's in her... I'm sorry, mom, she's in her... She's in her mid-70s now, and we were talking about this because she said, "I want to stay healthy; I want to keep my brain healthy," and I said, "Well, can you jump up and land?" And she said, "What are you talking about? That's crazy."

And I said, "Can you jump up and land?" I didn't want her to hurt herself, and we were talking about this, a lot of people, as they age, get injuries, hip injuries that take them out of commission. The ability to jump, not huge distances, but just to jump inland and be stable doing that. Obviously, you don't want people harming themselves, that's correlated with brain longevity and body longevity. What is it? Well, it's not just about shuffling around, it's because the bones are taking that impact. So, when we weight train, we provide load forces onto the bones, the bones send signals to the nervous system and to the brain, and so there's brain longevity, so that's a kind of a... It's a roundabout but very mechanistic way of answering your question that indeed when our body is strengthened, our brain gets better at the neuronal health level.

Now in terms of resilience, which I think... And our capacity to deal with stress, this is an interesting one. I think there are several places where exercise carries over to an enhanced ability to deal with stress. First of all, is all the indirect stuff, like it improves our sleep, it reduces inflammation in the body, provided that exercise isn't too intense or too frequent. So, there's all the indirect ways that it supports us and makes us more capable. But then there are the pain points of exercise, and those come in different forms, one of the less-discussed pain points of exercise is the one where you don't want to exercise and you do it anyway, that's making yourself mentally stronger, and here I'm sort of paraphrasing in a much less entertaining way than the great David Goggins, right?

His whole... Not his whole thing, he's about many things, but a lot of what David's about is about taking yourself from way back on your heels, don't want to get out of bed, I don't want to do something, and getting into that forward center of mass, that is a very valuable brain function to be able to take yourself from a place of, I don't want to do it at all, it's the last thing I want to do, and I'm going to lean into this. That carries over. And then the other one is the pain that you experience, healthy pain during the exercise itself, the burning of your lungs, the burning of the lactic acid build-up, the straining under a rep or something like that, and there your cognitive... Or your thoughts about what you're doing, I'm here because I chose to be. I might not want to be, but I chose to be. Those are two different things. I chose to be here. No

one's forcing me to do this, I don't have a gun to my head, I'm doing this, and this is going to benefit me. Over time, that will change your relationship to effort, and the holy grail of life, I believe, is when effort feels good, and no one gets to be in that state all the time.

But I think that when we push ourselves physically, we get multiple opportunities to learn to go from the, I don't want to, the I don't want to, I don't want to kind of... That's my voice in my own head. "I don't want to." And then doing it anyway, and then you have to remember to reward yourself, and that reward should not be in the form of an external reward, this is very important, it's tempting to say, I'm going to reward myself with the meal, I'm going to... You can still enjoy all the things you enjoy, but the reward has to be one that you give yourself mentally because when you start to give yourself external rewards, you're teaching your brain that rewards only come from the outside. When you give yourself internal rewards, and you can even make this a one-minute meditation practice at the end of a particularly hard cold shower, or you get out. You just sit there and tell yourself; this is good for me; I chose to do this. This is benefiting me. Those messages actually... I know it sounds a little hokey, but those messages actually help reinforce the whole process that you just forced yourself through and it makes it more natural. I hope that answers your question.

SHAWN STEVENSON: Absolutely.

DR. ANDREW HUBERMAN: Okay.

SHAWN STEVENSON: That's phenomenal. Phenomenal. That was so freaking awesome. Man, it's such a... I didn't even think about that aspect. I'm literally going, I don't do that. That internal reward mechanism.

DR. ANDREW HUBERMAN: Well, you're... Yeah, and so... And this is worth considering because you are at a place now where you're doing things that are good for you, you're feeling good about doing them, and so then the question is, how do you get the most out of those practices? And I think that there are some pretty diabolical but fun things that you can do, I've been playing with this a little bit, like this morning, I would decide I really want to take a run, normally, I hydrate, and I drink caffeine before I do any form of exercise like no caffeine, no exercise. Every once in a while, take away the thing that makes it a little easier or more pleasureful for you to lean into something. Now obviously, you don't want to do it in a way that's going to damage you, right, running barefoot on glass is not a good approach. But if you start to do this... Yeah, and I really resented it. I was like, I want my coffee first, I really want it first, and then what I realized is you are tapping into this ability to deliberately create more friction so that you deliberately get more out of the effort. And I think that we've spent so much time as a culture trying to make things so easy for ourselves, putting food into liquid form so we can just slurp it down, for instance, in high-calorie form, that's one of the...

That we even see this in kids now, I have colleagues at Stanford, maybe a discussion for another time, but who've talked about the fact that kids aren't chewing hard foods and their mouths... Their teeth are disrupted, their breathing pathways are disrupted, they have sinus issues, their... This is... Might sound trivial, but it's because of the soft foods. Yeah, after a certain age, kids need to eat hard foods and chew and adults do as well. They get sleep apnea, there's all these airway issues and structural issues, to say nothing of the cosmetic issues, the shape of people's heads are changing because of all these, the slurping down food in high-calorie form. So, creating some effort and some friction is actually really good for our biology, and we obviously don't want to go back to living in caves with no electricity and jumping in... Bathing in cold water and having to run up mountains every day for our food, but in some ways, simulating a little bit of what that was like in a voluntary way can absolutely benefit us. There's no question.

SHAWN STEVENSON: Thank you so much for tuning in. I hope that you're enjoying this conversation so far, there's so much more to come that we're going to be covering in part two. So, make sure to keep an eye out for it. We're going to be talking about the neurobiology associated with obesity, we're going to be talking about the science around intermittent fasting and how it impacts the brain, and some really cool stories as well that's going to highlight these incredible benefits, and we're going to talk about how stress and fear can directly impact the function of our immune system, so lots more good stuff coming up for you, keep an eye out for that episode coming very soon, if you like this, please share this episode out on social media and of course tag me and tag Andrew as well, and let him know what you thought about this episode. Alright, that would mean a lot, I'm sure.

And again, you could send this episode directly to folks via the podcast app you're listening on, of course, you could share it on all the different social media platforms, you could even call somebody, call them up on the telephone, the old school way and say, "Hey, you need to check out this episode of The Model Health Show." By any means necessary, let’s get this education into people's hands and hearts. I appreciate you so much for tuning into the show today. Take care. Have an amazing day, and I'll talk with you soon. And for more after the show, make sure to head over themodelhealthshow.com, that's where you can find all of the show notes, you can 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 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.