Unlock The Secrets Of Alzheimer's Prevention

Heather Sandison, ND
with Ari Whitten, MS

Heather Sandison, ND
Welcome to this episode of the Reverse Alzheimer's Summit. My guest now is Ari Whitten, the founder of The Energy Blueprint. He's the bestselling author of The Ultimate Guide to Red Light Therapy, Eat for Energy, How to Beat Fatigue, and Supercharge Your Mitochondria, For All Day Energy. Most people are focused on the external causes of health problems, like the toxins, pathogens, stressors, and the poor diet that you've heard all about at this summit. These treatments and interventions for health problems and dementia are important. But we want to talk today about the internal side of how we develop disease in terms of our communal dynamic space and our reserve capacity, and how we prevent ourselves from ever having to go down the path of dementia to begin with. Ari, welcome.

Ari Whitten, MS
Thanks so much for having me, Dr. Sandison. It's a pleasure to be here.

Heather Sandison, ND
Tell me a little bit more about your perspective and how you've evolved to understand health, well-being, and what keeps us healthy.

Ari Whitten, MS
Well, let me start by saying I'm big into paradigms, understanding that it's how we think about a particular problem, what our worldview is concerning that problem massively influences how we understand it in terms of what we think causes it and how we think about finding solutions to that. For example, when I did a PhD program in clinical psychology, I was fascinated with all of these different paradigms, psychological paradigms of mental illness, and what the best approaches are to treat them. You have everything from a cycle, a psychodynamic, a psychoanalytic, or a union perspective, where, from a psychoanalytic frame, you might spend years and years and years talking about different memories from childhood. The path to freedom is framed as once we unlock these unconscious aspects and become more conscious of these layers of our early childhood upbringing through years of psychotherapy, maybe we can heal these things. Somebody else might frame it from a cognitive-behavioral therapy perspective, we just need to focus on interrupting these negative thoughts and then replacing them with

positive ones. Rogerian therapists might say, I just need to sit across from my patient and sit in a very loving, empathic attitude and reflect on whatever they're expressing, and all that we need to do is cultivate that relationship. Somebody else, maybe with a new-age spiritual bent, might say, we need to heal your chakras and your past life Karma. These are different paradigms that different types of people would apply to the same individual with the same problem.

So what most people don't understand is that the same principle also goes on in medicine, and it goes on in our paradigms of medicine about how we think about health problems. The way my brain has always worked is from that meta-perspective. I like to analyze how we think about things to make sure that we're thinking about things in the right way. When it comes to dementia and Alzheimer's, there are some interesting things to think about from this meta-perspective. First of all, from a conventional medical perspective, the way that they will typically frame diseases, including dementia and Alzheimer's, is from the perspective of how we research what's what we think is causing this disease, which comes down to the micro-level phenomena of this disease. We go down to the smallest scale possible. We figure out what's happening in these people with this disease at the micro-level in their brains. What are the biochemicals? They're what genes are related to this? What different cellular and molecular processes are going on in this person? There are some misfolded proteins here that seem to be related to this. Once we zero in on what we think are the micro-level causes of this particular disease, what we typically do in the conventional medical model is go to a chemistry laboratory and synthesize man-made chemicals. We invent chemicals to try to target those specific mechanisms that we think are causing the disease. An example of this could be as simple as thinking that low serotonin levels are at play in depression. Let's synthesize a chemical that forces the brain to have higher levels of serotonin, or LDL, which is involved in atherosclerosis. Let's synthesize a chemical that lowers LDL levels—the same things that play in Alzheimer's. We have these amyloid beta proteins. Let's synthesize a chemical that blocks the formation of these amyloid beta proteins. That's the way that paradigm tends to operate.

Heather Sandison, ND
The antibodies that have been lit can be an antibody to the amyloid plaques that shows that we can clean them out, but it doesn't get us any improvement in cognition. It just slows down the tortuous process. We don't arrive at a full recovery when we use that paradigm. I couldn't agree more. We need alternative paradigms for this, particularly this problem.

Ari Whitten, MS
A functional medicine paradigm approaches things more from the frame of how can we go one layer deeper, one layer deeper. You could say to root causes or more upstream of these micro-level phenomena that we see are correlated to this disease: the Tau proteins, the amyloid beta proteins, the neurodegenerative processes, the neuroinflammation, what's causing the oxidative stress and the inflammation and driving these misfolded proteins. Let's do lots of different testing: blood testing, urine testing, hormone testing, and microbiome testing. Let's see if we can zero in on some of these factors, like toxins, pathogens, poor diet, stress, and poor sleep,

and modify things at that level. Some of these stressors are what are called allostatic loads. This is what's called an allostasis model of human health or a homeostasis model of human health. The central assumption is that we maintain health and homeostasis. But if we have too many demands from the system from these external stressors, whether it's toxins, poor diet, psychological stress, toxic relationships, or whatever it is, that brings the system out of homeostasis, and we get damaged and eventually disease.

Of course, there's a lot of truth in that paradigm, and it works to a large extent. What I have zeroed in on is that there's another half of this equation that doesn't get a lot of attention, even though it's important. That's what's called the homeodynamic space. This is a model that most people haven't heard of. It's only known and talked about in the Jarrow science space, which is the field of aging, and the homeodynamic space model is a little different than the homeostasis model. The key difference is that it's not just about these external stressors and demands on the system; it's about the system's capacity—the organism's capacity to deal with those demands. understanding that an organism can have a very large capacity, stress buffering capacity, or physiological resilience capacity to handle those stressors, whereas some organisms can have a very minimal capacity to handle those. Think about this: the number one risk factor for Alzheimer's is aging. Why don't young people get Alzheimer's disease? The reason why is that as this homeodynamic space shrinks as we get older, these stressors and demands on the systems that didn't affect us when we were young and healthy and had a large, robust homeodynamic space now start to affect us. So when there's a differential, essentially when the demands on the system or the stress on the system exceed the organism's capacity to handle those demands,

Now, you have accelerated biological aging. Now you have damage—accumulated accumulation of damage to those cells—and you have degeneration, oxidative stress, chronic inflammation, and all these things. But what's upstream of those things that many people frame as the causes is the shrinkage of the homeodynamic space. That's what I want to zero in on in this conversation. I want to give one more point of reference from the meta-perspective to think about. There is a tribe in Bolivia, in South America, that has been studied in recent years for a couple of things. It originally became famous for its extraordinary cardiovascular health and extremely low rates of atherosclerosis and heart disease, almost nonexistent in their population, as well as almost nonexistent levels of obesity, diabetes, and lots of other conditions. This tribe is called the Tsimane tribe, TSIMANE. There's another tribe that's also studied them called the Moseten, MOSETEN. This tribe was recently studied just last year for their incidence of dementia and Alzheimer's. What they found is that Alzheimer's is close to nonexistent in this population. In the United States, rates of dementia and Alzheimer's are over 1,000% higher, not 10%, not 20, not 50% higher. Not 100% higher, 1,000%. It's an 1100% higher incidence in the population.

One thing that's instructive if we're trying to find solutions to particular diseases is to look around, and say, are there any human populations that exist that have already figured out how to not have this disease? And once we have that answer, and in this case, we have that answer to a large extent, then the question is, why don't they get it? By the way, this is controlling. A lot of

people might say, they don't live as long as us. The study I'm referencing is talking about adults over 65 years of age. They are responsible for that. We're not comparing 40-year-olds to 80-year-olds. The reason they don't get it is a robust homeodynamic space. Because of their lifestyle. We can talk about some of the specific reasons and the modern research that links up to them.

Heather Sandison, ND
Go into that. I'm curious: how do these people live who don't get Alzheimer's? What do they eat? How do they maintain that homeodynamic capacity? We also use the word hormesis, that hormetic effect of stressing the system so that you can get more resilience. I am wondering how that intersects with this concept of homeodynamic capacity or health. I'd love for you to go into all of that.

Ari Whitten, MS
It's all about that. But this is a bit more philosophical, and our current understanding of what hormesis is and how it works is a bit limited, but it centers around this principle. We talk a lot about how stress and stress on the system are harmful. But there is an interesting counterpoint to this paradoxical thing: lack of stress is equally harmful and contributes to disease. I would argue because this is my bias and my focus of work, that it's even a bigger contributor than a lot of the things that we focus on in terms of stressors on the system. Now, of course, if someone is swimming in a toxic soup and eating a standard American diet, I would say that's going to be a bigger stressor than, like, proportionally. It's hard to outdo that one as a factor that generates disease. But for somebody who's reasonably healthy and trying to live a healthier lifestyle, it's the shrinkage of the homeodynamic space, the shrinkage of our stress buffering capacity, and our physiological resilience that is a massive driver of disease. Now, let me give some specifics. Here's one interesting thing I didn't mention about the Tsimane tribe and the Moseten. Let me just connect a couple of dots. I mentioned that aging is the number one risk factor for dementia and Alzheimer's.

Now, what this is is that it's not just chronological aging. It's the rate of biological aging. Not how many years you are alive, but essentially the rate of how much damage and dysfunction you have and how rapidly you're accruing cellular damage and dysfunction. What they found in the Tsimane tribe is that their brains are aging 70% more slowly than people in the U.S. and Europe. In other words, a 70-year-old has the approximate brain age of a 40-year-old, let's say, in the U.S. or Europe. The rate of biological aging is different, and the rate of biological aging is different as a function largely of the homeodynamic space being able to buffer the demands on the system. What are these key areas that relate to dementia and Alzheimer's risk? There's a fourth that I've zeroed in on. The list is probably longer than this. Ten years from now, I'm sure there'll be more layers to the story. But what we have good research on right now is number one, mitochondrial reserve capacity, or the homeodynamic space in the mitochondrial networks of our body, our brain, and the rest of our body. This is essentially our bioenergetic stress buffering capacity. Every

type of stress can essentially be seen as increasing the energetic demands on the cells of our body or our brain.

The degree to which we can meet those demands or not determines whether we are going to incur damage from them. If I can maybe create a crude analogy for how this principle works, the demands relative to the capacities: if I have a muscle, for example, that's only capable of stretching this far, but I take it into force and stretch it deeper than that. The muscle will start to tear. If I have skin that is capable of going out in the Costa Rican sun where I am right now for 20 minutes, but I stay out for two hours in the midday, I'm going to incur a lot of damage to my skin, sunburn, and DNA damage. If I have an exercise capacity where I can go for a jog for two miles before I tire out, but somebody is behind me whipping, Whipping me, and forcing me to run a marathon. I'm going to end up with stress fractures, a lot of muscular damage, and maybe kidney failure, and other big problems. I'm going to incur a lot of damage where somebody else with a bigger capacity for those things can do the same thing without incurring damage. Again, demands on the system relative to capacity. Mitochondrial capacity is a huge factor here. We'll come back to this, and I'll mention some of the other ones. I'll just list them out, and then we can come back to them. The other one is cardio-vascular reserve capacity.

Heather Sandison, ND
Cardiovascular.

Ari Whitten, MS
Mitochondrial, cardiovascular, psychological resilience, psychological stress, buffering capacity, and cognitive reserve capacity. I need to work on mine because it took me a moment to remember it. Cognitive reserve capacity is an interesting one, so we can talk about any one of those, and there's a lot of overlap between them as well.

Heather Sandison, ND
Let's jump into cognitive reserve because this is one of the most fascinating things I see in my clinical practice. I was reviewing a few cases with the Pacific Neuroscience Institute yesterday, and a couple of the people we were talking about who are struggling with cognitive decline in their 67s—one of the patients is in her nineties—had an immense amount of cognitive reserve graduate degrees. They were very involved in highly intellectual and very psychologically and cognitively demanding tasks, and they stayed that way. Although they had experienced cognitive decline and stressors, and probably at 96, some growing up in the US, mitochondrial reserve capacity and cardiovascular reserve capacity were diminished. They had worked on their cognitive capacity, and they had an immense amount of cognitive reserve. If you or I were to chat with them, we might not notice they had dementia. Now they weren't able to do the rocket surgery that they had been doing professionally 20 years previously, but they were still functioning at a very high level.

It's fascinating to see that the more education, the more we know that it's one of the modifiable risk factors. You talk about aging being a risk factor—the biggest risk factor for dementia. There's nothing we can do about our chronological age. We can't change the year we were born. But there are a bunch of these modifiable risk factors, and certainly, this idea of our biological age is one of them. There are a lot of things to discuss underneath that. But another modifiable risk factor that's well documented by The Lancet, a very reputable journal out of the UK, is how much education we have, especially in early childhood and through early adulthood. That creates this reserve. It's like we've got a bank account; we've got a savings account of intellectual capacity that we can then draw on as we age.

Ari Whitten, MS
Let me simplify this concept. I'm going to oversimplify it a bit, but it will facilitate some understanding. Imagine if we're looking at the concept of physical frailty, sarcopenia, loss of muscle mass, and being physically weak. like degeneration of muscle tissue, you end up physically weak. We call this sarcopenia; we call this physical frailty. If I spend a lot of my time, for example, in my early life or my older adulthood, middle age and older, building up my muscles, I'm going to massively build up those reserve arms of my muscular reserve capacity, such that it's very hard for me to degenerate to the point of sarcopenia and physical frailty where I have so little muscle mass on me and I'm physically frail and very weak and unable to perform basic tasks in comparison to someone who didn't do all that work to build up their muscular, reserved capacity. They're going to do it, and dozens continue to do it in adulthood and into old age. They're going to be many orders of magnitude more likely to end up with sarcopenia and physical frailty. Now most people aren't used to thinking about it this way, but the brain essentially works the same way. It's harder because we can't visually see it. We can see muscles. We don't process things this way, but the same thing is true.

Our brain physically changes its physical structure and builds a more robust physical structure, analogous to building more robust physical muscles. It changes the physical structure of the neural networks to be more robust. When we do cognitively demanding stuff, our brains are highly neural, just like our muscles are plastic. that system becomes more robust in response to being challenged. In the same way, when you challenge muscles by lifting heavy objects, they become more robust, physically stronger, and bigger. The same thing happens at the level of the brain. The more you have built up that reserved capacity through a life of cognitively demanding things, the more we have what's called in the scientific literature. As you were describing cognitive reserve capacity, We know through many studies that higher levels of education and higher levels of job complexity in adulthood are both indicators of cognitive reserve capacity that can also be directly measured on tests and things like that. That cognitive reserve capacity is massively protective against dementia and Alzheimer's. In terms of the magnitude of effect size, we're used to thinking that our current paradigm of dementia and Alzheimer's is very biochemistry-centric and very metabolic-centric.We think that if we do a blood panel and look at somebody's data on what's circulating in their blood, this will give us a full picture of what's

going on. But that piece of paper with all the lists of what's in their blood doesn't tell you anything about their cognitive reserve capacity. It's not a full picture of their health.

This is, as I was describing at the beginning, a problem of paradigm. It's that we are focused on the biochemical, biochemistry-centric, pharmaceutical-centric version of health. However, there are many blind spots to this paradigm and physical structure. The degree to which our health, our disease risk, and our longevity are determined by the physical structure of our organ systems is a huge blindspot of that system, including the physical structure of the brain. To give you an idea of the magnitude, obesity, as compared with a normal weight, increases your risk of dementia and Alzheimer's by about 37%–40%. Low cognitive reserve capacity increases your risk by even more than that, by 40 to 60% in most studies. This is not a small, trivial thing. This is as significant of a risk factor as obesity, which we know is massively detrimental to our metabolic health. This is a side to this discussion that you just rarely see discussed. But what does it point to? There are so many layers to the story. One of the things that we have in our culture is this idea that we're going to work hard and work and work and work. then when we get to be 65, finally, I can retire and do nothing and sit on the beach and sip margaritas and relax and watch TV and whatever. I don't have any stress on me.

That's one of the worst, most toxic things you can do for your brain: stop engaging in cognitively demanding tasks. Because what happens when you stop engaging? Let me put it this way. We go to a gym, where we lift heavy objects. Our muscles adapt by growing bigger and stronger. What happens if you immobilize muscle in a cast when you break an arm or a leg? Eight weeks later, you go to the doctor. They say off your cast, your muscles have shrunk to half the size. That's how our body works. It's use it or lose it. The body tunes itself to the demands on the system, and if you put demands on the system, it will adapt by growing more robust, physically altering its structure, even at the level of the brain. If you decrease the demands on the system, particularly not just over eight weeks but over years and decades, you will incur massive atrophy of that system, and that will, at the level of the brain, hugely increase your risk of ending up with a degenerated brain and dementia and Alzheimer's in particular. Cognitive demands on the system, having a life where we regularly engage in cognitively demanding tasks, having that something that's built into our life that we do at least a few times a week, if not daily, that's cognitively demanding into old age, is one of the most powerful things that we can do to reduce our risk of dementia.

Heather Sandison, ND
We would like to add that it's something fun and great. Learning a new language or a new recipe means learning something that you're passionate about, a new sport, and combining it with physical activity. Whatever you're learning cognitively when having fun, you'll learn better and get more of that cognitive reserve, but you're also more likely to stick with it if you're having a good time. So there are lots of ways that we coach people through taking this advice and implementing it, putting it to good use. continue. Ari, this is such a great conversation. I'm so grateful for this perspective.

Ari Whitten, MS
Let's see one of the other layers of this story. Since I just explained how the body tunes itself to the demands of the system, let's talk about mitochondria. This is another hugely important layer to the story. There's lots of research now that has emerged in recent years, of course, linking mitochondrial dysfunction to Alzheimer's and other brain conditions. But there's research specifically now showing that mitochondrial spare reserve capacity, which is essentially what I'm describing, is the homeodynamic space. The stress-buffering capacity of your mitochondrial system is an early predictor of Alzheimer's risk and precedes the development of the disease. They're now looking at the development of measuring your mitochondrial capacity as a biomarker for Alzheimer's disease because we don't currently have very good biomarkers. We have some things that can be measured once you're more into the disease. But as an early predictor of risk, it's likely going to turn out that mitochondrial capacity is probably the most powerful biomarker we have.

Heather Sandison, ND
I'm curious; do you think there's the best way to test mitochondrial capacity right now? Is that available?

Ari Whitten, MS
That's a complicated question. There are a lot of tests that now exist that have come to the market in recent years. I can't say that I'm a big fan of any of them. Let me explain why a lot of the tests test for electron transport, chain complexes, functions, and/or testing this very indirectly. People say that organic acid tests indicate mitochondrial function and things like that. The tests are very limited, and here's a big part of the reason why. I talked about structure, the physical structure of our body, and the idea that our body tunes itself to the demands of the system. I like to use muscles a lot because this is where we all intuitively understand it. After all, we can visually see it, and it happens in a time frame where we can see it. Muscles grow bigger when they're challenged. I can look at a bodybuilder. They've got big muscles. I understand. That's because they challenge them in the gym by lifting heavy objects. I broke my leg. It's half the size now as it was before. I understand that it atrophied as a result of disuse, as a result of a lack of being challenged. But what people don't fully understand is that principle is at play at every level of the system in our bodies, and it's at play in our brains with cognitive function, as we just described. It's at play in our bones in terms of bone density. If you go into a situation where you've got the force of gravity, you're doing lots of weight-bearing activity and handling heavy objects.

Your bones will physically grow denser if you hit heavy things like a martial artist, your bones will physically grow denser. In response to that, if you sit on the couch all day or if you're an astronaut who goes into space, you're, but especially that latter one, your bones will rapidly lose bone density. That is also true of bed rest. We have studies showing that by lying down in bed for seven days, you can detect noticeable losses in bone density. Even at the level of our skin, for example, when I go out in the sun, my skin builds up a layer of adaptation to protect itself from

DNA damage, which we call melanin. If I don't go out in the sun regularly, my skin loses that. It's adapting everywhere. That same principle is at play with mitochondria, and we have evidence—multiple lines of evidence—that shows that with every decade of life that we're alive, we lose about eight to 12% of our mitochondrial capacity. Maybe it doesn't sound like that much, but what this means is that the average 70-year-old has lost 75% of their mitochondrial capacity. For people listening, this is not just a trivial aspect of your physiology. This is essentially your cellular engine. This is what produces almost all the energy that powers almost all the cells in your body. This is what I'm describing here: going from a Ferrari V8 in your cells when you're young to a moped engine by the time you're 70. Now, while that sounds like bad news and you might think, well, that stinks, that aging does that to us, we now know that this is not a natural, normal byproduct of the aging process itself.

This is a product of modern lifestyles. specifically, it's due to a lack of hormetic stress and a lack of physiological challenges on the mitochondria. Just as a muscle shrinks when you don't challenge it regularly, your mitochondria, these subcellular organelles that provide the energy that powers your cells, also physically shrink in size. They atrophy, they shrivel up, and many of them die off. Our cellular engine physically shrinks in size from a VA to a moped engine as we get older. The way that this is measured, going back to your question on mitochondrial tests, is that they take a thick needle and jab it into your muscles, pull out a chunk of muscle tissue, look at it under a microscope, look at the size and structure of the muscles, and count the number of mitochondria per unit area. and that is a method by which you can vastly more accurately, determine the size of the cellular engine. even though that is limited.

Heather Sandison, ND
This is an invasive way to look at mitochondrial density. How many mitochondria are there per space per cell, per high-powered field, or whatever you're looking at under the microscope? But it doesn't tell us about how well those mitochondria are working. That does sound like it would be limited.

Ari Whitten, MS
I would argue that it's the other way around. It means that if you just look at the function of whatever mitochondria are there, you're going to be blind to the size of the cellular engine. But if you've got a large cellular engine, like a youthful-size cellular engine, you can reasonably assume that that system is functioning well. If you only have a window into the degree of function of the mitochondria that are there, but you don't know the size and number of mitochondria there, I would argue that's way more limited in what you can assess from that situation, which is why I'm not a fan of most of the mitochondrial tests on the market. You can know just as much by just asking somebody about their energy levels. It doesn't sound like science or sophisticated, but the truth is that it's just as good of a measure as any of the mitochondrial tests that exist on the market to just say, do you feel energetic or do you feel tired? A lot of the time, if somebody reports being chronically fatigued, we can reasonably assume that their mitochondria are in pretty bad shape. Anyway, this picture of the story shows that mitochondrial reserve capacity is

hugely important to dementia and Alzheimer's risk. We also know that this is what explains to a large extent why so many different hormetic stress interventions, like many types of exercise, for example, which are a type of stressor on the system, sauna, fasting, and time-restricted feeding, photo biomodulation, exposure to light, and things like intermittent hypoxia and training, all have proven research showing profound benefits in either preventing or actively treating dementia and Alzheimer's.

Heather Sandison, ND
We use contrast oxygen therapy at Marama at the residential care facility, and I often recommend that patients even use it at home or find a system that they can use at a gym or a local biohacking center because it has been profoundly helpful. If you can do it, if you can will yourself to do it, if you can get into the habit of doing it if you can get access to it to exercise and go through contrast oxygen, where you're exposed to concentrated oxygen and then exposed to depleted oxygen while you're exercising, profoundly helpful.

Ari Whitten, MS
All of these different things have in common that they all create bioenergy stress on the system. They all have mitochondria.
Heather Sandison, ND
I didn't hear you say hot and cold. Did you mention temperature?

Ari Whitten, MS
Sauna.

Heather Sandison, ND
Sauna. What about the cold?

Ari Whitten, MS
It likely has benefits, but there's not a lot of research to speak of. I'm sure you're familiar with the research on saunas by Jari Laukkanen which looks at sauna use and dementia risk. Also, we have done lots of research looking at the mechanisms that can explain these findings. But the observational research is almost mind-blowing. It's like the people who use the sauna nine to 12 times per month, relative to those who use it less than four times per month, have a greater than 50% reduced risk of Alzheimer's. This is not a small effect. This is like a massive effect. Not even using the sauna daily. We're talking about using the sauna-like once every three days, roughly. We can cut our risk of Alzheimer's in half as a result of that

Heather Sandison, ND
Some of the interventions. like you're getting some detox, you're improving circulation, and you're getting this hormetic effect that stresses the system. If you do it with someone else, you're getting that social aspect. There are so many great things that come from the sauna, I guess.

Ari Whitten, MS
What all of these interventions would do is counteract what I was describing before, which is this natural tendency of the Western lifestyle to take youthful Ferrari V8 engines and turn them into moped engines. The good news is that the system is malleable. It's dynamic, just like our brain is, just like our muscles and our bones are. You take the demands off the system. It shrinks; it atrophies. But if you put the demands on the system in a smart way, that's appropriate dosing, systematic, progressive, and consistent, not just one-off or intermittent random doing of these things. It has to be consistent, systematic, and progressive. If you do that, you can rebuild those mitochondrial networks. You stimulate mitochondrial growth and mitochondrial biogenesis, the creation of new mitochondria from scratch. We can rebuild more youthful mitochondria in our muscles, in our inner organ systems, and in our brain, and move back towards that Ferrari V8 engine. If you're 92 with end-stage Alzheimer's, you're probably not going to make a ton of progress on that. if you're right at the end of your life, but if you're 75, if you're 65, and you're still in a reasonable condition where you haven't lost your function dramatically, like if you can engage in some of these things, you can make enormous progress very rapidly. We have studies, for example, using interval training and exercise that have shown that in eight weeks, 12 weeks, or 16 weeks of training, you can increase mitochondrial capacity by over 50% in two or three months. It's very powerful if you engage even, let's say, 10 minutes of the berry oxy type of training, hypoxia, while on a stationary bike type of thing. You can make massive changes in your physiology and the structure of your physiology very rapidly.

Heather Sandison, ND
I would argue that doing something like that is hard and psychologically challenging. So, probably again, this is the overlap between the cardiovascular, mitochondrial, cognitive, and then psychological reserve capacity. As you stress the system, you prove to yourself that you can do hard things, and that adds to the psychological reserve capacity. You speak to that a little bit.

Ari Whitten, MS
Great segue. One of the other aspects of the story that is pretty well researched is that chronic psychological stress is linked with the risk of Alzheimer's. Once you have Alzheimer's, the progression of the disease starts, and this is a weird snowball effect because having the disease itself can also be very stressful and scary. So that it can induce all kinds of stress. But what we want to do as much as possible is get ahead of it. Most of the discussion of psychological stress centers around how we minimize sources of psychological stress and how we get rid of stress once we feel stressed. How do we do this breathing practice or this meditation mindfulness practice to release stress and that thing? There can be lots of benefits to those things. There is good research on many of those interventions. One interesting layer that doesn't get a lot of attention is looking at this from a hemodynamics-based perspective. What is your level of psychological resilience? What level of objective circumstance exists in your life? Does your brain and nervous system even register stress? Because stress is a very subjective thing. I could give lots of examples here. Somebody could be thrown out of a plane with a parachute against their will and be terrified for their life. It could be the scariest experience imaginable. Or somebody

could do this very same thing for fun and have a big smile on their face. Stress is very subjective. I went to it when I was in France recently with my kids, I took them on a tree-climbing adventure course. My four-year-old daughter was on these obstacles hooked in. It's completely safe. You're hooked into a cable overhead, and you're going over these obstacles. The initial obstacles for the little kids are only like, maybe, four feet off the ground. You're on wobbly pieces of wood. They're moving, and she's shaking, terrified, and screaming. Get me off of this thing, 20 minutes later, she's doing the same thing. Pretty good. Still a little scary. We came back the next day. We came back the next day again. All of a sudden, she's 20 feet off the ground, doing zip lines with a big smile on her face. No fear, doing obstacle courses that are way more complex and way scarier, without all the fear, without all the stress.

What's interesting is this territory of how we make it so we perceive less of what's happening in our lives as stress. We register less stuff as stuff that is stressing us out. It's good to have tools to deal with stress once you're stressed because we all inevitably get stressed. But I'm interested in how we become more psychologically resilient so we can handle life without being stressed so much of the time in the first place, and one of the things that you just alluded to as you segue into this is a big focus of that. and it ties into some of the things we talked about, like exercise, saunas, cold exposure, hypoxia, and training. These are all uncomfortable things. They're all difficult, uncomfortable, and sometimes a little bit painful. They're challenging. They're not easy. We have lots of resistance to doing these things. There are benefits. There's a huge benefit to that. But one of the big things that we can do while we engage in some of these physiological challenges or hormetic stressors is cultivate a certain internal attitude while we do them. Alluding to some of the examples I just gave, but let's, let's, let's picture this scenario. Two people go into a cold plunge into a tub of cold water, and for one person, it's, get me out of this thing. It's so uncomfortable. I'm freezing. It's terrible, The other person not.

Heather Sandison, ND
That was me this morning. That's the first one. Eventually, I got to the second one, but not initially.

Ari Whitten, MS
Then you're right. You're teetering right on the edge, which is where you want to be. If we cultivate an internal attitude of calmness while we have induced a physiological stress response. When you get into that cold plunge, you are inducing, regardless of your reaction, a stress response. The physiology of getting into that tub will create a big surge of stress, hormones, adrenaline, and lots of other biochemical changes, as well as activation of certain brain regions that sense pain and discomfort and are telling you to get the hell out of that uncomfortable, terrible, freezing thing. If you practice intentionality and consciously decide that you are going to relax and calm yourself down and not listen to those signals, you're going to use your prefrontal cortex to override those signals from your body, from your amygdala, and your stress hormones, telling you to get the hell out. You are practicing how to cultivate mental calmness, serenity, and resilience. You're practicing how to dissociate what's going on psychologically from the

physiological stress response. How do I train myself to be calm even when I have adrenaline pumping through my system?

Heather Sandison, ND
Equanimity is the work that I use and my mantra when I'm sitting or in one of those situations where the stress response is heightened. I'm like, All right, just get through this equanimity. That's exactly, exactly suede. Too much is too reactive when you're in a situation that comes up because, inevitably, they come up for all of us.

Ari Whitten, MS
What we do when we practice this is training this greater. We enhance top-down control, first of all, to dissociate our mental and psychological responses to stress from being physically stressed, which is an invaluable skill. Having greater control over your responses to stressful things is massively beneficial in life. One of the other things that we're doing is adjusting our HPA axis set points, our sensitivity to stress in the brain, and our hormonal levels. When we practice these types of things, they get adjusted to the demands on the system, and our autonomic nervous system learns to regulate differently as we start to put ourselves in that situation. The other thing that I would say is interesting but doesn't get talked about much is doing things that are a little bit scary. I've always been drawn, and I've always been scared of the ocean. and sharks, big waves, and sharks. I'm a surfer. For me, that activity becomes like a training ground for my mind. It's like I get to go regularly every day or every couple of days. I get to confront my fears and train myself to be more comfortable in a scary environment.

What are we doing there? Again, linking things back to adaptation, linking things back to structure, and homeodynamic space is what I was just describing with adjusting these set points: when we are engaged in a stressful or fear-inducing thing, we trigger certain brain regions. The classic, the stereotypical amygdala response, the fight or flight response, and that thing. when we do that and brush up against our fear, just outside of our comfort zone again and bring that intentionality into it. How do I call myself down? I'm safe. I got this. I can handle this. We have had the experience of having the courage to do that thing again. Number one, we build the adaptation of courage itself, which I consider an adaptation that is analogous to building more muscle, building more strength, and having more courage. We think of it as this intangible thing. But the truth is, there's a part of the brain that relates to that capacity. I bet that if you practice courage, that part of the brain will get physically bigger and stronger. We already know that's true. For example, with willpower, which also grows physically, the anterior cingulate cortex grows physically bigger and stronger.

In response to consistently controlling your impulses and doing difficult things, so true with courage. When we do this, we also tamp down the sensitivity of the fear and stress response circuitry. I encourage people to also find some type of practice. I love surfing. I love rock climbing. I'm also little. When I was younger, I was scared of heights until I started rock climbing. For me, those became training grounds to continually brush up against these things that put me in

situations where my brain goes up. Danger alert, this is scary. Get yourself out of this situation. I find that it has been transformative. It's been invaluable in my own life to build my courage and calm the fear circuitry in my brain.

Heather Sandison, ND
This is just getting out of your comfort zone. For somebody else, that might mean going to that party, going to that new book club, or inviting a neighbor over so you can get that social interaction. It might mean starting a new sport, showing up, or signing up for a class—all sorts of things that get us out of our comfort zone and what's easy. This is the idea that stress can be good for us. Of those patients I mentioned that we were reviewing last night, one of them took on going to these classes for cognitive function. Then, from there, that led to her leading a new class for other people who were suffering from cognitive decline. Then that led to her going to this Fit Brain program. It all started to snowball in the best possible way, and she became like one of the matriarchs of this whole program for them. It just sounded like a neat story and such a testament to exactly what you're describing.

Ari Whitten, MS
And that's it.

Heather Sandison, ND
I want to make sure everyone knows how to find out more. There's so much good stuff here, and there's no way we're going to be able to cover all of the insights, wisdom, and perspective that you have here today. Please add what you have, because all of it is super relevant and amazing, and then please let everyone know where they can find out more about you.

Ari Whitten, MS
I just want to say, in response to what you said, that one of the biggest things that people are afraid of—like sharks, big waves, and heights—is public speaking. I forget the exact statistics, but those famous studies showed that more people were afraid of public speaking than they were of death. It's like the fear of public shame and humiliation and embarrassment is so great in people's minds. What you were just describing of this woman who infused this aspect of, we're doing cognitive training, I'm building up my cognitive reserve capacity, and now I'm going to challenge myself to even teach you, put myself out in front of people. It takes a lot of courage to do that. Now we're also infusing that layer of the story that I talked about.

How do we tamp down the fear circuitry and build up that courage to the point where public speaking, getting on stage in front of people, no longer induces a big stress response and is no longer so scary? That's the building of courage. That's correlated with all these changes in how the nervous system and the brain function. a very cool example as far as where you can find more about me is theenergyblueprint.com, and my new brand is called humanoptimization.com.

Heather Sandison, ND
Amazing. It's such a privilege to have you here. As I mentioned before, I've been wanting to have you on the summit for several years, and it's finally happened. Thank you so much for sharing your time in Costa Rica with us today.

Ari Whitten, MS
Thanks so much for having me.