Introduction to Ari Whitten

Hi. Welcome back. It's Dr. Jen here today. We're going to be talking to Ari Whitten. He is an amazing guy, founder of the Energy Blueprint. He has his master's degree is the best selling author of The Ultimate Guide to Red Light Therapy and Eat for Energy, How to Beat Fatigue and Super Charge your mitochondria for all day energy.

So today we are going to be talking about how to beat your fatigue, supercharge your mitochondria and unlock all day energy. So Ari, welcome to all our lectures listeners.

A little bit about you. Well, the very short version of what's most relevant here is I've been a health geek all my life. I've been studying health science as my my biggest passion in life since I was 13 years old. And it's not just academic study.

There is also a component as as an athlete, as a bodybuilder. Growing up, there was a huge component of being a biohacker, being an experimenter with my own biology before the term biohacking even existed.

And that's something I've been doing for 25 years now. And I'd really be doing even if I didn't make a career out of it, even if I didn't make a dime out of this, I'd still be studying health science, you know, five or 7 hours a day.

So yeah, I've I've I guess I've put in the work to know this area in great depth in and not just again on an academic level, but through actual personal experimentation.

Why Generalist Health Thinking Matters

And I think it's given me some unique insights that people value. Absolutely. And you've been doing this, like you said before, Biohacker was even a term, which is amazing.

And I like how you put that, that you're not only your clinical research like what you have done in school, what if what you've read in the books, the papers, you've read your own research, but actually putting it into action.

And I think that is really important. When we look at trying to change our lives, our lifestyle, you really have to learn from people that are actually walking the walk and that's what you're doing.

Yeah, absolutely. What do you think? The role. Sorry. Go ahead. Oh, go ahead, Ari. I was just going to say, you know, I just to add to what you're saying there, you know, I have some I have a number of formal credentials in formal education.

And, you know, my undergraduate training was in kinesiology and exercise, science and nutrition and physiology and biomechanics and and then I was a personal trainer and I worked with athletes and I worked in corrective exercise settings.

I've spent a lot of time looking into circadian rhythm, spend a ton of time looking into mitochondria science around light. I've written books on light, written books on nutrition and body composition and overall metabolic health and mitochondrial health.

And you know this. And then I've done a master's degree in human nutrition and functional medicine and there's a broad landscape here that is, I think, really important in.

And what I mean by that is the world is becoming more and more specialized and individuals specializing in narrower and narrower topics. It used to be the case you went to a doctor and it was just like the town doctor who knew about all sorts of things, about all the different systems of the body, and then as science and as medicine has

progressed, people have become more and more specialized.

And there's an expression that I really like from one of my mentors, he, Paul, who said people know more and more about less and less until they know absolutely everything about nothing.

And what I am a huge fan of is being a health generalist, someone who understands a lot of the different systems of the body and a lot of the different environmental inputs that determine our genetic expression and what's going on at the cellular level of all the different systems of the body.

And by virtue of having that generalist framework, you can connect a lot of dots that the specialist can't. So, you know, I think in a highly specialized world, I pride myself in being more of a generalist.

I could not agree more. I definitely agree. Compartmentalized is what medicine is. And it's it's good if you have a specific maybe brain tumor that you need operated on.

But when it comes to things like diabetes fatigue, thyroid, you want someone looking at the whole picture. And I and I do. I agree with that. Well, my conventional background was emergency medicine.

And what I loved about that is and I still practice, is that everything comes in. You got to know a lot about everything because you never know what you're going to get, which makes it interesting.

Yeah. So it's pretty fun. But you're right, we, we really moved from the town, the town doctor. But my friends and I come sometimes we, you know, we dream about just living on an island, like who's going to be the farmer?

I'll be the doctor, you know, I don't even know if you ever do that. But we always are like, okay. And my one friend chiropractor. So he'll adjust everyone.

You know, I can deal with the emergencies too. Yeah, it's so funny, but it's true. We we need more people looking at the big picture instead of looking right in at that one leaf, they need to look at the whole tree.

So do you think that conventional medicine plays any role in treating chronic fatigue or helping people with their energy levels? Or do you think they do a lousy job?

Oh, that's very direct. I'll give a very direct answer. I think they do a very lousy job. So and I'll back that up with some some some evidence. So it's been a while since I looked at this paper, but I'll try to recall what I can off the top of my head.

Conventional Medicine and Chronic Fatigue

So several years ago there was a paper published that was a review of the evidence, and it was a paper published for doctors involved in the treatment of patients with fatigue.

And it was basically putting together evidence based guidelines for doctors to treat their patients with chronic fatigue. And the paper was called Fatigue and Overview, and it was published in the Journal of the American Family Physician.

So if somebody wants to look it up and they can verify everything, I'm about to say so number one, then the first insight from this study was they they determined that there were four treatments for people with chronic fatigue that were, quote unquote, evidence based according to this review.

And those treatments were the use of antidepressants, a recommendation to walk for half an hour a day, which is probably the one I have the least problem with, is cognitive behavioral therapy and the use of stimulant drugs as needed to boost your energy levels.

Those were the four treatments they said are, quote unquote, evidence based that doctors should prescribe their

patients with chronic fatigue. Notice they didn't even mention nutrition, the like, which means that these chronically fatigued patients could walk into the the office of one of these doctors who's who believes themselves to be following the best scientific evidence that we have on treating chronic fatigue.

And that doctor would not even think to assess whether that person is eating fast food, McDonald's, potato chips and pizza all day, or if they have a healthy diet.

It's not even in their paradigm to think such thoughts or ask such questions. Right. But do you think that eating McDonald's and candy bars and soda might be responsible, might be a contributor to the chronic fatigue epidemic that we have going on today?

Of course it is. Yeah, of course. The modern consumption of the Standard American Diet is a huge contributor to the chronic fatigue epidemic. The same is true of sleep hygiene and circadian rhythm optimization.

We have we have an epidemic of dysfunctional circadian rhythms that result in dysregulated metabolic health, dysregulated hormonal health, dysregulated neurotransmitter stores, dysregulated mitochondrial energy production.

It's I mean, circadian rhythm and sleep aren't even mentioned in their evidence based guidelines, you know, and that's just to name a couple. There's lots more factors I could list here that are of great importance and that we have lots of evidence for scientific evidence for that show a link with chronic fatigue that aren't even mentioned.

They're light exposure, gut health or medic stress toxins. Right. Not mentioned in their, quote unquote, evidence based review at all, but anti-depressants and stimulants are two of their top four.

You've now. Now, the other thing that this review of the evidence found was that what they in the section where they discuss testing of patients with chronic fatigue, they recommended standard lab tests like there's just the standard blood panel as far as what should be tested in these patients, unless there was some indication to test for some other specific thing like you suspected, some other condition, just as a random example, let's say you suspected tuberculosis, you'd run a tuberculosis test or whatever.

The the point is that they're saying the standard blood panel is what we use to test these patients. Now, when they talked about the results of testing and as far as specific biomarkers that could explain chronic fatigue, they found that there is no specific biomarkers that are diagnostic for chronic fatigue.

And they said specifically 95% of the time or actually I think their words were only in 5% of cases. Were there any abnormalities that show up on that test that could be explanatory in the chronic fatigue?

Only in five out of every 100 patients that come into their office with chronic fatigue, do they find anything on those tests that would say we've we've got an indication of what's causing your problems, let's fix this.

And usually those things might be anemia or hypothyroidism or something like that that might show up on a standard blood panel. But in 95 out of 100 cases, they don't find anything of significance on those tests.

That is explanatory that helps them arrive at a different treatment. Other than the standard treatment I just explained CBT, walking and depressants and stimulants.

So do I think they're doing a lousy job treating patients with chronic fatigue? Absolutely. Yes. I think that is not it. Not even remotely based on the best evidence of what we know to be linked causal with as far as causing chronic fatigue, as far as the best treatments, we have a base available for fixing it.

Right. And what year was that published? Again. It's maybe eight or ten years ago, something like that. I don't know. Off the top of my head. Yeah. So, so so pretty recent when it comes to studies and and I see that a lot of patients will come into my office and by the time someone sees me in my office, it's because they're frustrated with conventional medicine.

You're like, I know something is wrong. And that's what's sad. That's the saddest thing I think, is patients know when their body is off, they know something's wrong and they're looking to their doctor to help find out what it is because they know something's off.

They they're not coming in. They're asking for an antidepressant and or a stimulant. I mean, rare, maybe sometimes they are, but most of the time they're just looking for help.

And the guidelines. Yes, they're they're not they're not good at all. But it also perpetuates a pharmaceutical based medical system where you take a pill for every ill.

And it's it's unfortunate, but at least they had the walk in there. I think that's good. But some patients that are fatigued are so fatigued that they they can not even go on that walk so that would be out for them.

So how do you enhance? What would you do? How do you think you can enhance mitochondrial health? So the the mitochondria can pump out more energy? Yeah, great question.

Mitochondria, Cell Danger Response, and Fatigue

And it's a it's a big answer. I'll try to answer this succinctly and then I'll I'll let you direct the line of questioning from there. So first of all, within the conventional medical paradigm, if you ask them, you know, what is the cause of chronic fatigue, the general answer will be, we don't know it.

Or they'll say it in a scientific sounding way. They'll say the etiology is unknown, which means we don't know what the hell causes your fatigue. And if you don't know if you don't have an understanding of the root causes, it's very difficult to fix a problem.

You can tinker with the system and you can certainly use pharmaceuticals to override symptoms and biochemical pathways like using stimulants to force the body to produce energy.

But that's not the right approach. And we can talk about stimulants and why it's not the right approach, but without even without going into the scientific the physiological mechanisms of why stimulants are not a solution.

We all know that if it were the case that caffeine and stimulants were a solution, nobody would be walking around fatigued, right? Chronic fatigue wouldn't be a problem if the solution was actually as simple as just forcing the system to produce more energy by using stimulants and caffeine.

It's obviously doesn't work now and happy to talk more about that later. Now, if you ask me, what is the cause of fatigue? Well, we have lots of good evidence for many different specific pathways and factors at the environment and lifestyle level that we know disrupt our physiology in certain key ways that impact on our cellular ability to produce energy.

Now, the most sophisticated and evidence based paradigm that we have today to understand what is going on in the state of chronic fatigue, comes from a brilliant researcher named Dr.

Robert Navajo, who runs a lab for mitochondrial medicine at the University of California, San Diego. And I've had the pleasure of meeting him in person at his lab and getting a private, you know, multi-hour tour of the lab and sitting down and chatting with him.

Absolutely amazing guy. Brilliant guy. And he's he's put forward a number of important pieces of research, the most important of which is called the Cell Danger Response.

And basically, this paper was a synthesis of essentially decades of research from researchers all over the world looking into the different roles of our mitochondria.

And mitochondria are our cellular energy generator. So what everybody is going to remember listening to this

podcast when you hear the word mitochondria is they're going to go, Oh, that's the powerhouse of the cell.

We learned that in high school and college biology, mitochondria, a powerhouse of the cell, and even most doctors who took physiology courses in medical school, that's for the most part all they really learned about mitochondria.

Mitochondria, the powerhouse of the cell doesn't go a whole lot deeper than that. You know, so everybody knows that. But there's there's no real layers beyond that.

Now, it turns out that this framing that we're all taught around mitochondria is sort of these mindless cellular energy generators that just take in carbs and fats and pump out energy in the form of ATP adenosine triphosphate.

That's what our it's the the energy currency that our cells use to do to perform their functions. And most of the energy, virtually all of the energy provided to virtually all of the trillions of cells of our body, from our brain to our muscles, to our bones, to our organs, to our hormone producing glands.

Virtually all of it comes from mitochondria in those cells. So mitochondria are really important. And that and the key thing to understand here is that to the extent that you do not have big, strong, healthy mitochondria and lots of them producing abundant energy, the cells in those tissues, whether it's your brain or your muscles or your thyroid gland or your liver or anything else, will not perform their role as well.

To the extent there is an energy deficit, there is a deficit in those cells doing their functions, whether it's thinking or moving or pumping blood or producing hormones or whatever the function is, they don't do it as well.

If they have a low energy supply, if they have poor mitochondrial function. Now, again, there's this framing of mitochondria as these mindless cellular energy generators.

But it turns out from decades of research now, from researchers all over the world looking into mitochondria, we keep discovering that they have other functions.

You know, oh, they play a role in immune health. Oh, they play a role in regulating inflammation. They play a role in regulating regulating oxidative stress.

Oh, it turns out they send signals back to the nucleus of the cell where the DNA is stored and greatly impact on what genes are getting switched on or switched off, what genes are getting expressed, and on and on and on.

That the biggest thing to understand about mitochondria, what Dr. Nabeel explains in this paper, the cell danger response is mitochondria have a second role beyond energy production that is really, really important and encompasses all those things I just mentioned, actually.

And that is that they are environmental sensors, they're essentially danger sensors. They are like the canaries in the coal mine of our bodies. And they are the most sensitive, the most upstream thing that is the first essentially to detect when there is danger, when there's a threat or stressors present in the body.

And in response to that, if those threats or danger signals or are deemed to be to be in excess of the body's capacity to deal with stress, if basically if the stress signals are very high, what the mitochondria do is they coordinate a response called the cell danger response that is designed to turn down the dial on energy production and shift cellular and metabolic resources towards cellular defense, shift the body into a state where it's in protection mode to defend against that threat.

That stress, as opposed to what Dr. Navy calls peacetime mode, where it's focused on producing abundant, abundant energy. Now, an analogy to think of this is imagine you were in the kitchen preparing food and you're cooking dinner, you're doing your your thing.

And then a burglar or a thief walks in, puts a gun to your head and says, you know, give me all your valuables, give me all your jewelry, give me all your money. Right?

You don't just keep chopping vegetables and preparing food and carrying on business as usual. You have to stop and deal with that threat. And that is exactly the situation that ourselves and our mitochondria are in when they are tasked with dealing with threats.

So if they're in that situation, they turn down the dial on energy production, shift resources towards cellular defense. Now that stress can come in many, many different forms.

It can come in the form of poor nutrition, it can come in the form of poor sleep and circadian rhythm. It can come in the form of environmental exposures to toxicants.

It can come in the form of alcohol or cigaret consumption. It can come in the form of deficits in exposures to beneficial stressors. It can come in the form of emotional and psychological stress.

And there's a whole field, for example, around mitochondrial psychobiology. There's a whole field of research dedicated to the link between mind and mitochondria.

And all of those stressors can impact on the mitochondria in a way where if that stress load is too high, or if the combined stress load of multiple types of stressors is too high, the mitochondria go, okay, this is too much.

We need to focus on defending against all these threats. Let's turn down energy production. Let's put that energy production stuff on hold for a while and we're going to deal with these threats.

The problem is, if the stressors are chronic and they're not removed, the body can stay stuck in that mode for a very long time. And that is essentially what's going on with chronic fatigue. So anyway, I'll let you jump in with a question from here.

But that's the the basic paradigm. Yes. And I think with the last two years with COVID, we've really seen people with chronic fatigue. I mean, it really took it up a notch.

And we've seen, you know, clients, patients like this a lot, you know, before with the chronic fatigue due to Epstein-Barr or like you said, environmental toxins or even emotional problems and emotional history and trauma.

But now I think it's kind of conventional medicine has to deal with that a little bit more because now all of these patients are coming in with these fatigue symptoms and now they're all just given a label a long haul.

But at the same time, it all comes down to the same thing. The mitochondria, how it's really involved with the actual root cause of fatigue. And yeah, the mitochondria, like you said, we just.

Oh, it's the powerhouse of the cell. Well, why isn't it working properly? So our body can only handle so much until it gets to that point where it's going to shut down, kind of hunker down and deal with it, what it needs to do to just function every day is sort of giving us that energy we're used to.

So it's definitely a red flag. And like you said, there's mitochondria in in every cell in your body. So the thyroid mitochondria are important, too. So for those listening out there, they're probably wondering, well, okay, you told me all the things that could make my mitochondria not function well.

So how can we improve mitochondrial function on a daily basis? So there's there's at the highest level, there's two foundational things that we need to do to correct this state of physiology.

One is obviously remove the main triggers that are present that are causing this excess level of stress in the first place. And again, that can be toxins.

It can be circadian rhythm and sleep issues, it can be poor nutrition, it can be mind mediated stuff, psychology and and emotions. It can be infections, it can be any number of things or combination of them.

So what we have to do is kind of a self inventory and figure out, first of all, what, what which of those factors is likely to be my main cause or my main causes.

Is it? Well, if I've got a poor diet, pretty much be certain that's at least a contributor, if not the entirety of the cause. If you don't sleep deeply or enough every night, you can be certain that's a contributor or a major contributor.

Sleep and energy are two sides of the same coin.

How to Restore Mitochondrial Health

If you're not sleeping deep and well, if you don't have a strong circadian rhythm, you're guaranteed not to have nearly as much energy as you should have if you're chronically stressed psychologically by working a job you hate, having no passion or purpose or meaning in your life guaranteed that is, soul sucking and energy sucking.

If you are chronically stressed from relationships or from your relationship with coworkers or your boss or financial situation, those can obviously be huge drains on your energy.

If you've got toxin exposure, if you've got infections, if you've got mold in your house, if you never see the light of day, literally, if you don't get adequate sunlight regularly, these are all the types of things.

And I maybe also mentioned gut problems. If if you have gut related symptoms, if you've got fatigue after meals, you you need to do that assessment and figure out which of those factors is are the key players for you.

And then you need to go about, you know, an individualized program to address that. If it's, you know, clean up your nutrition, clean up your circadian rhythm and sleep, I would say, are the two big years that almost everybody can do better at and will make an improvement almost universally, even if that's not the main contributor to your problems, like let's say it was triggered by mold, for example, or let's say it was triggered by Epstein-Barr infection, which I have personal experience with in my twenties and is not often not a fun one at all, much worse than COVID for me and whatever the causes it could be some other random thing.

Toxin exposure doesn't matter. It even if it's one of those things, it is still the case that making improvements in your nutrition, making improvements in your circadian rhythm and sleep are likely to greatly improve the overall function of you as an organism, because all the systems of your body are interconnected.

So, you know, modern medicine has promoted this idea that it's this disease is from this one pathway and we can use this drug to interrupt this pathway.

If you've got heart disease, it's because of your cholesterol. And then we can use the statin drugs to change how much cholesterol you have, and then we can alter your cardiovascular disease.

And if you've got depression, it's because your serotonin in your brain is not high enough and it's that one pathway. And so if we just use this drug, this SSRI over here, we can change the level of serotonin in your brain and that fixes your depression.

But that's not actually how it works. The whole body is interconnected, and that depression isn't just a simple result of a chemical in the brain that's at too high or too low of a level.

It's humans are complex organisms and it could be the result of working a job you hate and being with an abusive partner or someone you're not in love with, or or being lonely and single and being socially isolated from community and from family and from friends and not having a relationship.

Or it could be from toxin exposures, it could be from lack of exercise, it could be from poor nutrition, it could be from so many things. And the and the same is true of cardiovascular disease, obviously, as well.

And the idea that it's this just this one pathway in isolation and that we can take a drug to interrupt that pathway is

total pseudoscience. And we've accepted this overly simplistic pseudo science as, quote unquote, the science, you know, like the the mainstream, most scientific, most evidence based paradigm.

And it's total reductionist, myopic nonsense, you know, and you know that like the most ignorant sort of thinking that I could think of from like people who developed a system of intervention that's based on like a willful desire to not understand all of the complexity that actually causes these conditions.

Now, getting a little sidetracked here with my ranting, but my love it. You're so holding it up. I love it. I'm going. So I want to loop back to what I was saying before.

So just remind me where I was. I was talking about. Oh, you were talking. About. Like, how can we help our mitochondria? How can we kind of make them more robust because they're injured, help them back to be effective powerhouses.

Okay. So number one of these two, two high level strategies, number one, remove these stressors that are present. Okay. Correct. The chronic stress that is present from these different factors in your life, how you eat, how you move, how you think, how you sleep.

These are these are big things. Now, beyond that, it's also important to understand this second layer to the story. And this is something that is almost universally not well understood, even among high level natural health, functional medicine practitioners.

And that is that the status of our medical Andrea in our cells not in the sense of whether they're switched into energy motor defense mode, but in the sense of do you have cells filled with big strong mitochondria and lots of them, or do you have cells filled with weak, shriveled, fragile mitochondria?

And very few of them? And and and I mean this in a very literal way. The difference between, let's say, having a thousand mitochondria. Purcell Or 3000 mitochondria.

Purcell This is a very big difference and I'm not pulling these numbers out of nowhere. These are actually pretty real numbers. Now, the number of mitochondria Purcell actually differs depending on the specific tissue you're looking at.

It could be anywhere from 500 in some tissues to upwards of ten, 20, 30, 50,000 in some other tissues of the body. Like certain regions of the brain, for example. Now and the difference between them, let's say 1000 to 3000 is also a pretty real number.

Now, let me explain what I mean. We have a number of lines of research that have shown that for every decade of life after the age of 20, people lose on average, about 10% of their mitochondrial capacity.

Now, maybe 10% seems like a pretty small number. But let me let me put this in a different way. The average 70 year old has lost 75% of their mitochondrial capacity, 75% of their cellular engine, their capacity to produce energy at the cellular level.

And specifically what they've shown is that the number of mitochondria gets cut in about half during that time and the energy producing capacity of each individual mitochondria gets cut in half.

And if you do the math on that 75% loss of mitochondrial capacity, now, this is a really big deal. If you've gone from a Ferrari engine in your cells to a moped engine, that is a huge deal when it comes to your energy levels.

A moped engine cannot produce the same amount of energy that a Ferrari engine can. And now even if you optimize your nutrition, even if you remove stress and start meditating and correct all the sources of psychological and emotional stress in your life, even if you remove toxins from your lifestyle or clean your house of mold, remove infections from your body, even if you do detox protocols, even if you optimize your sleep, even if you get all those things in place, even if you take mitochondrial supplements with acetyl l-carnitine and creatine and de ribose and

alpha lipoic acid and PKU and all the and B vitamins and all those kinds of things.

Guess what? It still doesn't change the fact that you have a moped engine in your cells. It can help those mitochondria that comprise that moped engine to produce more energy and reach their fullest capacity.

But the fullest capacity of a moped engine is still nowhere near the fullest capacity of a Ferrari engine. Okay, so here's so this might seem like bad news because people might be thinking, well, that really sucks that we lose so much of our mitochondria as we age and aging.

Is this really horrible thing? Well, here's the good news. The good news is when we look at 70 year olds who are lifelong exercisers, they have the same mitochondrial capacity as a young adult.

They do not lose 75% of their mitochondrial capacity. So what I just described to you is actually not a natural byproduct of the aging process itself.

It is actually the product of modern lifestyles, specifically modern lifestyles that are deficient in comedic stress, a beneficial stressors like exercise.

And there are multiple different types of of exercise, resistance, exercise, endurance, exercise, high intensity interval training, deficient in fasting, deficient in sunlight, exposure, deficient in breath holding or intermittent hypoxia.

Deficient in cold exposure and heat exposure and exposure to or medic phytochemicals. These are the beneficial stressors that humans evolved with over millions of years, and our physiology literally required in order to express normal function.

Okay. And I'll give you an analogy to understand what's going on here. If you've ever broken a bone, you've ever broken an arm or a leg, you get a cast on.

And then eight weeks later you go back to the doctor. They saw your cast, you look down at your leg and it is half the size of the other one. It's half the size because all those muscles atrophied from not being stimulated and not being challenged from not being stressed.

And if they are not being stressed, the body goes well because the body only cares about survival. So the body goes Well, I guess we don't need all that energetically costly tissue anymore. Let's get rid of it.

And that happens. That leg shrinks to half the size in two months. Now, imagine what happens internally at the cellular level, at the mitochondrial level.

Same exact principle applies, but Now imagine what happens over the course of decades of not adequately challenging and stimulating your mitochondria.

They atrophy, they shrivel, they shrink away, they die off, you lose your mitochondria. And that's exactly why most people lose 75% of their mitochondrial capacity as they age.

Exercise, Zone 2 Cardio, and Practical Tips

The good news is it systems dynamic and we can reverse that process to a large extent through systematic application of these automatic stressors. So step one, remove the chronic triggers of the cell danger response step to rebuild your cellular engine, your mitochondrial engine through horn, medic stress.

Yes, those are great. And unfortunately, right now the lifestyle is kind of you sit, you watch Netflix, you order GrubHub or I don't I always get the name wrong or DoorDash trade at GrubHub.

I don't have a subscription to those. So, you know, you're not cooking your own food, you're not moving around,

you're sitting there watching TV, you are not looking at the sun studying your circadian rhythm.

So it's tough because everything around us is kind of promoting a sedentary lifestyle, even our jobs, right? With the pandemic, a lot of people went to virtual and they sit all day.

So it's tough. But you can just exercising. I mean, you heard already say that. So just exercising every day is going to increase that mitochondria and give that paramedic stress.

And if anyone where is a continuous glucose monitor ever, you'll see that I sit in my sauna, I get a blood sugar spike. I, I work out I get a blood sugar like a heart not a big spike.

So when we do those things, they're not bad for us. Our bodies are reacting to them because people always comment, Oh, is that bad? You got a spike? I'm like, No, it's pharmacists, it's stress on my body.

But a good stress. It's not a bad stress or like a traumatic life event or something. It's a good stressor in our body. Needs that to become stronger in our mitochondria.

I need that to be stronger. So I think it's a delicate balance too, with Hashimoto's disease, because when I, for example, exercise. So Ari, I'd like you to touch on this, if you don't mind.

So my Hashimoto's patients that are in an acute Hashimoto's autoimmune problem going on, they're not in remission or anything. We're deep into it. We're trying to reverse it.

I have them lay off the high in the hit workouts, the high intensity intensity interval training, and I have them do weightlifting, they can do kettlebells, they can walk.

So I want them to still have that hormonal stress, but just not in the hit intensity. Do you do you have any thoughts on that? Because that's kind of a hot button topic.

Yeah, I do. I have a lot of thoughts on it. So number one, let's understand the principle that everyone's threshold for tolerating and being resistant to stress and including or emetic stress is individual.

So one person's food is another man's poison. One person's or emetic stress is another man's toxic dose of stress that only causes harm. Right? And is another person's too small of a dose that doesn't generate any benefits because it's too low of a dose to generate to stimulate the body, to make adaptations that confer those benefits.

And what I mean by that, just to back up who medic stress works on the principle that our body is a living dynamic system that is designed to be adaptable.

And when we challenge it, when we expose it to stress it, it engages mechanisms that adapt itself to handle that stressor, to better handle future exposures to that stressor and to bulletproof itself to protect itself against damage from future exposure to that stress.

A simple way of understanding this is you lift a weight, you do bicep curls, your bicep grows stronger and grows more muscle to handle that load. That's a form of adaptation to handle the stress that it's been exposed to, that there are many layers to those adaptations.

And it also differs depending on the specific type of automatic stress. But the central mechanisms of how that work is adaptations at the mitochondrial level, stimulates mitochondria to grow and stronger, and also stimulates adaptations in what's called the air the antioxidant response element, which is our internal antioxidant and detoxification system that neutralizes large amounts of free radicals, potentially damaging free radicals.

So through we're medic stress, we build up that system to be more robust. We build up our internal levels of very powerful antioxidants like glutathione and catalase and superoxide dismutase that are then by keeping that system charged up, we massively increase and by keeping our mitochondria big and strong and capable of producing lots

of energy and meeting those energetic demands of exposures to stress, we are creating resilience, physiological resilience at the cellular level.

You know, people talk of resilience as like a purely psychologic cycle thing, like to be to get to bounce back after adversity. But there is actually a massive physiological cellular component to resilience and this is exactly what it is.

You're at the mitochondrial level, you're making adaptations that make you more resistant to stress, literally at the cellular level, the same stress load that would have damaged you at the cellular level previously no longer damages you because of those adaptations, because you're stronger at the cellular level.

Now, in the example you're describing somebody who's in a state of hypothyroidism symptomatic, you know, autoimmune, a lot of autoimmune activity going on and a lot of symptoms is going to be in a state of fairly low resilin.

So their threshold of what level of hermetic stress they can tolerate, what duration, frequency and intensity of hermetic stress they can tolerate is going to be on the lower end compared to, let's say on the other end of the spectrum.

Is a young, fit, healthy athlete. Right. Very high or medic? Stress tolerance. Very high, stress tolerance more broadly and a lot of resilience at the cellular level now.

So just as a basic principle, we need to understand that somebody who's less healthy and has less experience with her medic stress for several years, maybe they haven't been doing any of this stuff.

They've been sedentary, they've been eating a poor diet. They've been in climate controlled environments. They haven't done any fasting. They haven't done any breathwork.

They haven't you know, they haven't done any of these things for many years. They're going to be physiologically in a very low state of resilience. They're going to have a very low tolerance for going into this territory.

So you don't want to take a person like that and say, hey, go run a marathon, hey, go do some really ultra high intensity workouts. It's too much for their system.

And what you do when you do any sort of stress, including romantic stressors like exercise or sauna exposure or cold exposure or fasting. If you apply too large of a dose relative to what that person can handle, you only create.

You don't create benefit. It's beyond what their body can adapt to. So the goal is to to find the dosage that's just a little bit, very slightly beyond your body's current capacity.

So you can do it. You can push yourself into the realm of discomfort, but not create a whole bunch of damage and stimulate your body to adapt to that that that exceeding your capacity so that it makes those adaptations so that you can grow stronger.

So that's it's finding that Goldilocks zone of the right dosage. Now, as a general principle, I agree with you that high intensity interval training likely not the best place to start.

For most people, it's time efficient and there's lots of research to support it, but it's not the best place to start for people who are chronically ill.

Now, if you want to talk the best type of exercise for boosting mitochondrial health, this you might find this a bit counterintuitive. You might even be skeptical of what I'm about to say.

I was a personal trainer for for many, many years. And the culture and all the people that I followed when I was young and all of my my mentors during that era of time, everybody was saying, oh, you know, endurance, exercise, cardio, cardio is a bunch of waste of time.

It's all about weight training and high intensity interval training. And and, you know, don't waste your time doing all that cardio stuff. And I was a huge proponent of that for a long time.

And now I'm largely eating my words because what I will tell you is that I think zone to cardio, which is a specific range of intensity, is actually the single most important type of exercise for people to grow their mitochondrial engine in their cells.

And we have research from an exercise physiologist named Inigo San Millan, who does research on largely two groups of people. He actually also does a lot of research in cancer, but on metabolic health, he does a lot of research on two demographics of people.

One is elite endurance athletes, and the other one is very overweight or obese diabetics, people with metabolic syndrome. And what he says is that those two people are opposite ends of the spectrum of metabolic health.

The elite endurance athletes are the pinnacle of metabolic health and mitochondrial health. And he goes, he actually has measured mitochondrial content, the amount of mitochondria and size and all that stuff and capacity in those demographics of people.

And what he's found is that endurance athletes have 400% more mitochondria in their cells compared to overweight diabetics, 400%. This is not ten or 20%.

This is not a small difference. This is four times the size of the engine. It's a two cylinder engine versus a V8, right. So he also said and this is what really affected me as somebody for over 20 years who really believes the idea that weight training and high intensity interval training are what matter and that all that endurance stuff is a waste of time.

He said that when he looks at athletes who only do weight training and high intensity interval training, they do not have nearly as good of metabolic health as the ones who do endurance exercise.

Now, the last thing I'll add here is just what is zone two cardio? It's a specific heart rate zone. It's actually better defined by blood lactate levels, but it's harder to measure.

It's more of a pain in the butt to prick your finger and measure your blood. Lactate. It's easier to do based on heart rate and you're in the range roughly of 60 to 70% of your maximum heart rate.

This is also I don't really recommend this because it's not very accurate, but you can also roughly gauge this intensity by something called the torque test, which is essentially your ability to get out a 12 word sentence without having to take a breath in between.

So it's a way to sort of subjectively gauge your intensity. If you're if I'm talking to you and I'm having to breathe, like and then I went to the store and then, you know, like that's an intensity level.

If I'm breathing that frequently, I'm in zone three, zone four. If I'm breathing like that. So it's below that threshold. You can have a conversation, but you're breathing.

Somebody could probably detect if you were talking on the phone, they could detect, Oh, you are you walking right now? Are you are you riding a bike? Like you sound like you're breathing a little harder than normal.

Okay, so it's that range 60 to 70% of max heart rate and. We want to ideally be in the realm of 3 to 4 hours at least, let's say 3 to 4 hours a week of that zone to cardio.

And the reason that this is important, without getting too detailed in cellular bio energetics, is this is as intensity of the exercise grows, the more we shift from relying on fat burning in our mitochondria to relying on glycol lytic what's called anaerobic glycolysis using carbohydrates for fuel in a less efficient process but faster process outside of the mitochondria.

And what this zone two is, is the highest intensity possible, where your body, where your cells are still relying predominantly on fat for fuel through mitochondrial energy production before the intensity gets higher and it shifts predominantly to carbs for fuel outside the mitochondria.

So it's the maximal intensity that we're putting most of the stress on the mitochondria, and that is what stimulates the most robust adaptations at the mitochondrial level.

And it will not have the same level of nervous system stress overall like stress, intensity of stress on the system as intensity interval training would, and therefore is a much more appropriate type of exercise for someone in the state.

You described. I love that. That's that's really fascinating. I think I immediately go to the Stairmaster. You know, I really like you've seen that lately.

And I feel like I'm in that good zone where I'm not too hard, but I can still feel, you know, that good fat burning area. So I like the Stairmaster also walking at an incline.

But I also think if you know, a lot of Hashimoto's women out there, they're busy mother. So a brisk walk. When I go on walks with my kids riding their bikes, I'm almost doing speed walking, plus a little jog, intermittent jog, because they go so fast, so If you're talking about 3 to 4 hours, that seems super overwhelming.

Like what? I have to do that for my mitochondria, but try to break it up into going outside for walks with your kids during the day. I live in Ohio, so it's kind of cold here, but we still go on walks, especially if the sun's out and I get the kids outside.

So turn out to be overwhelmed about that. I think 3 to 4 hours is a high number for some people, you know, but I think even if you would only do an hour to 2 hours, you're still going to get mitochondrial benefits, correct?

Yeah, absolutely. And I should and thank you for pointing that out. I should clarify to not intimidate that this this is a target that we're aiming for working towards.

Right. This is I'm not saying start with this. So what you can start with if you're currently non exercising is start with a ten or 15 minute session of brisk walking.

Now three or four times a week, ideally every day, if it's just brisk walking, if your body can tolerate it and you build from there, you know, at a at a minute or two or three every week to your routine.

And ten weeks from now, where will you be? You know, if you're adding 2 minutes every week, you added now 20 minutes to each one of those workouts. Now you're in a range that's not that far away from what I'm describing.

And six months from now, let's say a year into that kind of systematic progression with just baby steps every week, you can easily reach the the target that I've described it.

It's it's really not not that hard at all. I will say brisk walking is generally going to be zone one, not zone two. But if you step up, you can do incline walking on a steep or stair climber like you're describing.

And you can definitely get into zone two doing that or doing a very light jog very slow jog is going to be in zone two, most for most people. And yeah, absolutely.

Three times a week, 15 minute sessions. You're talking 45 minutes of exercise a week. This is not not that much. Yeah. Sorry. Thank you so much for those tips.

And I think that's the thing. Start small, like Ari said, and then build up and then you can even add in fun stuff like red light and cool plunging and all of that.

So it's all about biohacking, as Ari has been doing for, for decades at this point. And again, once you feel good, once you feel the mitochondria awaken, you're going to want more.

It's kind of addicting in a good way. So another tip you could do is when you're going on your walks, you can listen to Ari's podcast, which is amazing.

So I tell everyone how they can find you, listen to you, your website and everything. Yeah, actually, on on that note, I will give one other tip. One thing I really like is actually riding a stationary bike and you can set up they sell these fluid friction trainers that you can just hook up a regular bike to and it's wonderful for doing zone cardio with and you can while you're doing that listen to podcasts listen to audiobooks, do business calls or calls with your friends you can dedicate this time.

Let's say it's two, three, 4 hours a week. You can dedicate that time to catching up with friends, catching up with family, you know, and you're getting that phone call in while you're doing a workout.

You did an hour of time talking to friends and family, and you did an hour of mitochondrial boosting exercise or an hour of learning from a great audiobook or podcast.

And it's with this type of exercise, it's low enough intensity that you can set things up and kill two birds with one stone. It's a horrible analogy, but accomplish two great things at the same time with.

This type of exercise, in contrast to most other types of exercise, high intensity or weight training or something. So just to answer your question, my websites, theenergyblueprint.com, I also have books on on Amazon but yeah in general my all my work can be found at theenergyblueprint.com Awesome.

So I had such a great time talking with you and I loved your rant, but that was my favorite part. So we really appreciate everything you're for, for health out there in the world.

So thank you so much for spending your time. Thank you so much for having me. It was a pleasure.