Introduction to Energy and Fatigue

All right, everybody, welcome back to another session of the Solving Sexual Dysfunction Summit. We have with us the amazing Ari Whitten. Thank you so much for being with us today.

My pleasure, Betsy. Thank you so much for having me. Now, it was funny because I was thinking about as we're doing this session, because we're going to be talking about energy and fatigue. And I actually have to admit, I was sitting here going, I am so tired right now.

I don't even know if I can make it. to this conversation But even more so, a reason to be talking about energy and fatigue. Absolutely. You know, and that's a great point, I think, Will, we'll get into as we discuss that, because energy is really foundational to everything.

Energy is foundational to you know, there's even research on productivity and success showing that physical energy levels are foundational to that and that many of the people who are the highest achievers in personal success in both financial success and who are happy people, not just workaholics, but happy people who have flourishing lives.

One of the core traits that that distinguishes that demographic of people is that they take time every day to cultivate their energy levels. Because because we know that if you don't have enough physical energy, you can't do whatever it is you want to do.

And that includes everything from working in your career to your sexual relationships. And I agree, like, I think how many times patients come in the office and I think this energy and especially fatigue, has happened to be probably the number one complaint of everybody.

And many times people are like, well, it must be my hormones or I must be I'm deficient in this, or give me some kind of supplement or pill for that. But I'm going to ask you, what is it that we really need to be thinking about when it comes to fatigue and having more energy?

Yeah, so it's a great question and I love your framing actually. I'm writing a book right now and a big part of what I'm talking about is how mistaken so many of us have become as far as how we think about health.

Why Energy Is Foundational to Sex and Health

And we've become obsessed with, you know, conventional medicine has has indoctrinated us in from the time that we are children and not intentionally so like all so conventional, it's not sort of a brainwashing into in a sense, it's like the conventional medical paradigm is is one that generally frames.

First of all, every everything that is is talked about in health is from a is viewed from a disease centric paradigm. So we look at everything through the lens of what is the pathology that is going on here.

So depression, for example, is seen as what is the pathology that's going on in the brain, heart disease, what is the pathology that's going on at this level and so on and so forth?

The from there, what what we've done with the conventional medical paradigm and this is largely the result of the antibiotic revolution from about 100 years ago, where we first scientists observed observed that in petri dishes, certain bacteria didn't grow very well or were actively being killed by certain mold species.

Penicillium Mold species in this case, and that led to the discovery of penicillin. And following that, the invention of lots of different antibiotic chemicals, drugs that were curative were genuinely curative of diseases that were

previously deadly, whether bacterial pneumonia or staph infections in your skin, and all kinds of different infections like that, and also parasitic diseases.

And we we took these diseases. The scientists and the doctors of the time took these diseases and developed a specific chemical that went in the body.

You swallowed it. It went into your bloodstream in like a heat seeking missile. It went around and killed the bad guy and by curing this one bad guy, it cured this disease in a matter of in a matter of a few days.

And this was a genuinely transformative thing. And what we did after that was basically say, well, if we can do this with infectious diseases, maybe we can do it with everything else.

You know, heart disease and cancer and depression and liver disease and obesity and diabetes and on and dementia and all these different diseases. So for the last 75 years, basically, there's been and a paradigm that seeks to understand dysfunction and disease and identify what are the specific make grow level mechanisms that are happening in heart disease and in depression.

Oh, it's so deficiency of serotonin. Oh, it's LDL cholesterol in infiltrating into your endothelium and your blood vessels and oh, it's, you know, it's too high of blood sugar.

So let's figure out a drug that blocks the mechanism of that. So from this understanding of the specific mechanisms of these diseases, basically we we we said these are the causes of this disease.

Whatever the the cellular genetic, molecular biochemical mechanisms that we found are associated with a particular disease. These are the causes, quote, unquote, of the disease.

And then we go into a chemistry laboratory and we invent we synthesize manmade chemicals that are designed to in some way interrupt or fight or block that specific pathway that we found associated with the disease.

So, oh, depression, we found it's a deficiency of serotonin. Let's create a drug that blocks the uptake of serotonin. So it raises your levels of serotonin.

Dementia, Alzheimer's. We have these formations of these amyloid plaques in the brain. And let's analyze the biochemical sequences that are involved in the formation of these plaques.

Let's develop a drug that blocks the formation of these plaques.

Conventional Medicine vs. Root Causes

And what we're really finding well, let me first say this. So to get back to your framing, so because of this pursuit that we've all grown up with, this is almost a century long.

We've all kind of learned since the time that we're kids that what causes our problems, our symptoms and our disease are these specific micro level mechanisms inside of our bodies, like our body is is this sort of mysterious black box of hormones and chemicals and enzymes and neurotransmitters and inflammatory cytokines and senescent cells and genes and telomeres, and, you know, all these these different things like that.

And we have all been indoctrinated to believe that those specific micro level things are the cause of our condition. You know, like if, if we, if we walk and we stub Barto on a chair or something like that, we know that that's not a micro level phenomenon that caused that pain in our toe and that swelling in our.

It's not it's not because of inflammatory cytokines. That's not the cause of it. You're right. Or these immune cells that we could find if we did a biopsy of that swollen tissue, that's not the cause of the condition.

The cause of it is that you stubbed your toe, you smashed your toe against something and physically injured those

tissues. But when we and we know that if we smash our toe or have some other injury like that, but when it comes to a lot of these other diseases, we've all been and trained to believe that our our body is this mystery us black box full of these micro level chemicals and different hormones and things like that.

And that's the cause of our issue. And it's just plain wrong. Most of our problems are not caused by, quote unquote, these specific micro level things and mechanisms that are associated with the disease.

We have to zoom out and see the broader picture of what is going on in that person's life that is causing those biochemical changes that are associated with that particular disease state.

We already know over 80% of the chronic disease burden are diseases of lifestyle. They're diseases of environment and behavior, not diseases of random genes and hormone problems and different biochemicals that are going awry for random reasons that are unrelated to how you're living.

It's largely the result of how we're living in the vast majority of cases. You know, and kind of connecting it with our topic of sex is especially for the female patients.

I treat, you know, they're always looking for that hormone pill or they're they're upset that the men had the blue pill, which is just a blood flow pellets.

It's not a horny pill. I'm like, we don't have that yet. You know, that's not going to exist. But it comes down to a lot of people I talk to are just like, Well, I'm tired, I'm fatigued, and they blame it on, well, I'm a busy mom or I'm a busy person, you know, in my career.

And they're still not looking at the fatigue, which is the big elephant in the room that's like this big symptom that's now leading into like spilling over into other areas of their life.

And now we're starting to affect sex drive and it's affecting general wellness and their general health. So yeah, yeah. So I mean, big picture, before we get into some of the science and physiology around energy levels, let me just tie, let me follow up follow up on what you're saying there and what I was saying earlier, which is energy is foundational to everything.

We have to understand that the drive towards sex and the act of sex itself can only come out of an energy surplus if you are in an energy deficit, if you're chronically fatigued, you are not going to have the motivation to or desire to have sex.

We have to understand that the these things like libido desire, the ability to sexually perform these things come out of this energy surplus and it's tied into our physical energy levels are mood or libido, our motivation, our drive, all of these things are tied into the physiology of cellular energy production.

And if you're chronically running at a deficit that you are and look, it's human in there, too. I'm not I'm not a I have amazing energy levels. I'm very youthful.

I'm exceptionally healthy and fit. I have a great sex drive. But of course, even I sometimes get fatigued. I you know, if I, I surf, I play tennis, I lift weights, I rock climb.

I do a lot of physical activity. Sometimes I have a tendency to overdo it. Maybe I did 5 hours of exercise that day. I got a little carried away and at 8:30 p.m., I'm falling asleep when my wife wants sex.

You know, that's that's the reality. The simple reality, you know, on a macro level, instead of seeing things as mysterious, biochemical processes know, if you are drained physically and you don't have a large surplus of energy, you are going to want to lay on the couch and fall asleep.

You're not going to want to get up and, you know, perform a sexual act in and spend 30 or 60 minutes exerting a lot of effort and energy that you don't have.

You can't the body doesn't work like that. So we have to understand, again, energy, physical energy, cellular energy supply is foundational to sex, drive and sexual performance.

So then that brings the big question is what's what is fatigue and why is it happen and what do we do about it, which is that all three big questions?

Yes. Yeah, absolutely. Very big question. So first of all, let's let's start off by saying there are many different potential things that can that can cause low energy levels.

We can understand. And for specific individuals, it could be one thing or another thing. Okay. So we also need to understand the concept that there are many different mechanisms in our body that are tied into this story of energy regulation.

Mitochondria, Cell Danger Response, and Fatigue

You know, for a long time people thought, oh, it's adrenal fatigue, it's chronic stress, it's wearing out your adrenal glands. Now, they don't have enough cortisol to produce.

And cortisol, you know, influences blood sugar levels and, you know, the stress response. And so therefore, you know, this is the thing that's causing your symptoms.

And, of course, we now know from the body of evidence that's just not true. And fatigue is not anywhere close to that simple that in fact, most people who have chronic fatigue and the symptoms that are associated with adrenal fatigue don't even have any measurable adrenal abnormalities or cortisol abnormalities.

So or access function abnormalities. So if you imagine a car, for example, a car has many, many different parts of it that if you removed that part, the car wouldn't work very well.

If you take off the wheels and the tires car doesn't work very well, you take out the engine block doesn't work very well, you take out the crankshaft.

It doesn't work very well. If you take out the pistons or the spark plugs or the fuel or lots of other things, it's not going to function very well. So in that sense, it's kind of similar to our body that there are many pieces that can potentially go wrong in some one person or another that could be a cause of it for one person.

It might be working night shifts for another person. It might be when they were 13 years old, they lived in a city that had a lead poisoning issue in the water supply.

Another person got severe mononucleosis or another infectious disease and has been fatigued ever since, never fully recovered from it. There's lots of potential triggers and causes like that.

But if we if we go back to the car, what we really want to do is not just understand that every piece of that car is important in one way or another. But we want to ask, what is the most upstream thing that is actually controlling and regulating the energy levels?

There's lots of hormones and other mechanisms and neurotransmitters and different biochemical pathways and cellular pathways that are that are in one way indirectly or directly related to fatigue.

But the question is, what's regulating, what's deciding whether or not we have lots of energy, whether we have lots of energy or very little energy. You know, in the car it's the human being sitting in the car deciding whether to press the accelerator, pedal or the brake.

It's not the pistons or the spark plugs or the tires that make those decisions. It's the human being in the car deciding to start the engine. And I'm going to press the accelerator pedal.

How hard am I going to press it or am I going to press the brake? And how hard am I going to press that? What in the human body? The main thing making that decision is actually our mitochondria are what we all learned in biology courses and physiology courses.

The powerhouse of the cell. These are our energy generators in our cells. We have in virtually all of the cells of our body. We have somewhere between at the very minimum several hundred and in many cases upwards of 10,000 mitochondria.

Pacelle And virtually all of the energy for virtually all of the trillions of cells in our body comes from the mitochondria. Now, the big revelation that's come out of the last decade or so, largely due to the work of Dr.

Robert Nava, who runs a lab for mitochondrial medicine at the University of California, San Diego, and wrote us a seminal paper about a decade ago called The Cell Danger Response.

And this was a synthesis of lots and lots of research from researchers all over the world, basically discovering that mitochondria these these energy generators in our cells that we're all kind of taught about as sort of these mindless energy systems that just take in carbs and fats and pump out ATP, pump out cellular energy.

It turns out that there was lots and lots of research all over the world that discovered that these mitochondria were doing a lot more than that. They had other roles and they were participating in immune health and metabolic health and coordinating all kinds of responses of the body.

Doctor Inovio calls them the central hub of the wheel of metabolism and metabolism. That word doesn't mean just something related to weight loss. The word metabolism literally means all of the biochemical reactions that occur in your body.

And what what he's saying is mitochondria are at the center for of all of that. Okay. The most the most upstream thing. Now, the core revelation that came out of his work was that mitochondria essentially have two roles.

One is as energy generators and the other one is in cellular defense in protecting the cell against threats and helping to signal throughout to cells throughout the body that, hey, we're under attack, there's a threat, there's a danger present.

We need to protect ourselves against this threat. Now, the reason that these two things are linked to energy production and cellular defense is, is a very important and central aspect of understanding how the human body works.

And because these two roles are largely mutually exclusive, to the extent that your mitochondria, which are sort of like canaries in the coal mine, they're the most sensitive environmental sensors trying to test the environment, basically saying, are we under attack?

Are we is there a danger present right there? They're taking samples constantly to assess the degree of threat they're under. They are based on that making a decision of whether to operate in energy mode, in peacetime metabolism or to switch off energy mode and to go into defense mode or war time metabolism.

Okay. To the degree that they are sensing the presence of various dangers or threats or stresses that are present in the body, that are surpassing the body's capacity to cope with those stressors, they turn down the dial on energy production and shift resources towards cellular defense.

If all of this sounds very complex, just think of the last time that you got a cold or flu or COVID or something like that. One of one of the core symptoms of this, of course, is low energy levels, is fatigue.

My son just got over dengue fever. You can barely get off the couch for two days. So this is how our body is designed. We are designed that when we're under attack, when we're under threats and very strong danger signals, we're designed to to cut back on energy production and shift resources towards cellular defense.

That is the single most important thing to understand when it comes to the question of why is my body lacking in energy? Okay, now the question is what kind of dangers or threats or stressors does this system pick up on cancer?

What kind of dangers can our mitochondria sense? Turns out that they can sense basically anything and everything imaginable from toxins, you know, environmental toxicants to poor nutrition, to sleep deprivation, to physical overtraining, to pathogens, to injuries, to psychological stress.

There's a whole field, for example, of research called mitochondrial psychobiology that examines the connection between what's going on in the mind and the mitochondria.

And there are dozens, maybe hundreds at this point of of papers that are examining this this link between what's going on in the mind and the mitochondria.

And we know that if you have intense psychological stress that is sensed by the mitochondria and they they turn down energy production and shift resources towards cellular defense, especially in the in the chronic context, when things become chronic as opposed to an acute response to a very short lived stressor, we have to also understand this is an intelligent way that our body is designed.

This is not a mistake. You know, this is not something that we should try to correct just by taking a bunch of stimulant pills and forcing our body to produce more energy.

And that doesn't work. Actually, it's counterproductive. It would be great if solving the issue of chronic fatigue was just as simple as saying, Hey, take a bunch of stimulants and take a drink a bunch of coffee.

But it doesn't work like that. For reasons we could talk about if you want. But actually it ends up being counterproductive where the chronic use of stimulants actually suppresses baseline energy levels, even more, causing even more chronic fatigue.

So that's the first big picture, big point to understand about this question of why do I have chronically low energy levels? Well, my body is dealing with a degree of chronic stress or danger or threat load that is beyond its capacity to easily cope with that.

And because of that, my mitochondria are shifting out of energy mode towards defense mode. That's the first of two big keys to understand. That makes me wonder because I'm thinking about this coffee thing and you know, how many people are grabbing their coffee in the morning and then they're grabbing the alcohol that night to try to relax and chill out.

But what are their things? Are we doing that's that's counterproductive to our energy that we don't know about? Well, I would say the biggest one I mean, the biggest to you, you probably just mentioned maybe another one.

That's a common thing that that people do is just stay up too late with artificial light blaring into their eyes. One layer to this story of mitochondria is that melatonin, which is a I mean, first of all, a lot of people just think of it as a sleep supplement, but it's a hormone produced in our body.

And melatonin is, it turns out, has a vital role, very, very powerful role in protecting it. Of course, Andrea, from damage. And our mitochondria are designed to be bathed in melatonin every night before we go to sleep.

And during during the night while we sleep.

Sleep, Light Exposure, and Melatonin

And that melatonin not only acts as a direct antioxidant that protects the mitochondria from damage, but it also does something even even more important, which is that it recharges our internal antioxidant system of glutathione and catalase and superoxide dismutase.

It recharges that system that helps protect the cell, protect the mitochondria from damage so that the next day it has a buffering capacity to handle the stressors that you're exposed to.

And if and when you stay up too late, when your sleep is restricted, when you have artificial light blurring into your eyes before bed, particularly blue light to some extent green light from indoor lighting screens, things of that nature.

And just to give you a sense of this, this is not a 5% or 10% reduction in melatonin levels. There's research showing that just being in standard indoor house lighting, you know, LED fluorescent house lighting suppresses melatonin secretion by close to 70%. Wow.

So we're suppressing this massively important mitochondrial protective hormone that recharges a key aspect of our energy system every night. We're suppressing it not by five or 10% by 70%.

Mitochondria melatonin, by the way, also has very powerful neuroprotective functions and anti-cancer functions. So you're also if the energy part of the story isn't enough for you and the sleep part of the story isn't enough for you, also understand that by suppressing melatonin chronically, you're you're going to massively increase your risk for brain related diseases and cancer. So you know that I would say those are probably the big ones.

Stimulants, too much alcohol consumption and circadian rhythm disruption, too much artificial light exposure at night before bed. You know a thing with the melatonin.

I'm assuming that your own production of melatonin is a lot better than just taking a supplement. But I know, you know, I know my population of patients who are always just like, give me a pill for something.

So I'm going to ask like, does taking melatonin supplements help with this? Or are we affecting our own production of melatonin by doing that? Yeah, there's kind of tricky, nuanced answer to this, and it's some it's somewhat controversial territory because we have everything from certain health experts who are out there saying, take huge doses of melatonin.

Everybody should be taking, you know, 30, 40, 50, 80, 100 milligrams of melatonin every night because it's this amazing hormone that's so beneficial to so many different systems of our body, to other health experts saying, no, don't take melatonin.

You got to avoid don't ever take exogenous melatonin. And it's it's bad for you. And it causes this consequence. And that consequence. I'm of the opinion I have some I have an interesting personal lens for.

Well, actually, before I get there, let me let me also say there's an abundant amount of research showing that melatonin supplementation is beneficial, very clearly beneficial for many different health problems and diseases, including gut problems, brain problems, cancers.

And it's been studied in many different contexts and contexts and has generally shown benefits one can be so impressed with that body of literature that they say, Wow, I got to start using melatonin.

In fact, I was one of those people that was so impressed with that body of literature that I started supplementing with it. I discovered something interesting when I did, which was that melatonin makes me sleep poorly.

And I found the same thing too. And I don't know why. And I've tried a very large range of of doses and and I've also experienced some nasty side effects from even fairly small, fairly normal sized dosage of melatonin, where I've woken up, where I'm like groggy for 2 hours and I can barely function and I can barely walk around because I'm so groggy.

So I'm someone who is almost never sensitive to any kind of supplements. Rarely can I even discern an effect from a supplement, but for whatever reason, which I assume is genetic, I happen to be extraordinarily sensitive to bad effects from melatonin supplementation, and my dad has the same exact issue, even though he's in his mid seventies now.

So that's that's why I think it's largely genetic, is because me and my father happened to be in what I think is a very small demographic, maybe five or 10% of people that seems to respond to melatonin in this way.

I having said that, I don't want to paint a picture that everybody is like that because there are lots of people who use five or ten or 15 or 20 milligrams every night and who report lots of benefits from it.

So it helps them sleep. It helps them function better. They they feel much better when they take it. My mom, in fact, takes it. And I suppose I bought her taking it.

So I think it's individual in that context. What to answer your question about suppression of internal production in general with most hormones in the body, this is true that if you take an exogenous source, for example, if you take anabolic steroids or external testosterone, your own supply of testosterone decreases.

There's generally negative feedback loops in most systems like that. However, the current body of research on melatonin suggests that there isn't is not a negative feedback loop when it comes to melatonin, meaning you can take external melatonin and it does not suppress your own internal production.

And there are even some researchers, for example, Doris Lowe, who is a melatonin researcher, who argues the opposite, that taking external melatonin actually bolsters your your internal supply.

How to Support Mitochondrial Health

Having said that, that that's what the body of literature says, the the anecdotes of people who take melatonin and for a length of time and then go off of it, report as soon as they go off of it, they sleep poorly, which suggests maybe there is some kind of negative feedback, maybe not with the production of melatonin, but maybe with a receptor sensitivity to two levels of melatonin.

And maybe there are adaptations at that level of things. Maybe like there's a downregulation of receptors. When you start using larger amounts of melatonin, I think there's still more research to be done on that.

We don't know all the answers, and you have a demographic of people with paradoxical reactions like like me, who will respond negatively to it. So I almost wish I could take it because I've seen so much positive research, but it just affects me negatively.

So I stopped messing with it. But I fully support people taking it. Was there one more aspect of this that I wanted to mention? I think we'll leave it at that because I can't remember the other part.

I wanted to to. To say, well, that's one of the things I always love talking to you about, is because, you know, all the research, you're all up on, all the research on everything.

So, you know, I know this is going to be very individual, but are there things that we should be doing to support our mitochondrial health on a day to day basis so that, you know, we can try to be living the best lives that we can?

Yeah. So I want to make sure that we get into the second big key to understand. Let's go back to. That and well, this, this, this will answer your question.

Okay. So I want to just explain the context first. So the first thing, based on the layer of the story I explain so far with kind of overwhelming amount of danger or threat signals or stresses that in response to that, the mitochondria say, hey, we've got to go into defense mode, we're going to turn down the dial on energy production.

So step one, to just allow your mitochondria to function better is to try to minimize any sort of chronic stress load that you have going on. And this entails a number of basic lifestyle things like trying to manage your mind well, first of all, so that you're not chronically psychologically or emotionally stressed, certain contexts in certain contexts, a person's entire issues could be driven by the psychological dimension, from trauma, from being in a bad relationship that's terribly stressful or an abusive relationship from working a job they hate, from fighting with family

members chronically.

You know, these things can be very powerful sources of enormous stress on your physiology and can absolutely just that one factor can completely sabotage your energy levels.

Poor nutrition, of course, for a huge portion of modern Americans is a driving factor. Circadian rhythm disruption and poor sleep, poor sleep hygiene.

Poor circadian rhythm hygiene are another major, major factor chronic exposure to environmental environmental toxicants from the food, from the water, from the air, you know, taking basic steps to to to correct those problems, to eat a nutritionally sufficient diet so you don't have vitamin and mineral deficiencies or macronutrient deficiencies.

You know, there's a gut mitochondria axis as well. So nurturing are the health of our gut and our microbiome. And our gut lining is critically important as well.

If you've got leaky gut and microbiome imbalances, you've got signals chronically being sent, your mitochondria, the body's under attack, it needs to shut down.

So those those things have to be addressed to ease the stress load on the mitochondria. But there's there's another important layer to this story beyond just sort of easing the bad stuff, you know, trying to reduce or eliminate the bad stuff that's overwhelming the mitochondria.

We have kind of a narrative in, I would say, most people, most health experts who are talking about mitochondria and it's kind of a new thing. Mitochondria are in vogue right now.

In just the last few years, when I started talking about them a decade ago, nobody was talking about the mitochondria. Now they're in vogue. Now everybody is talking about it.

Mitochondrial dysfunction is is is the catchphrase now in natural health and functional medicine circles. But there is a very common and very massive misconception that's out there on mitochondria, which is that the idea that our mitochondria are sort of these static entities in our cells like this, this and this engine inside of our cells that just is is kind of static and unchanging.

And really all we have to do is just if you've got low energy levels, maybe you ease up on the stress and you take some mitochondria, vitamins, you know, you take some B vitamins, you take some Coke, you ten, you take some PCU, su macedo, l-carnitine, some magnesium, some, you know, nicotinamide, riboside or and a man or things like that.

And once you supply these cofactors for mitochondrial energy production or for an 80 plus or, you know, these sorts of things that now the mitochondria can can function healthy again.

And the reason that this is a misconception is because mitochondria are very far from static in our cells. They are highly, highly dynamic and malleable and they are constantly responding to the signals from the environment in terms of their physical structure.

Okay, this is very important concept to understand. This is not just a matter of biochemistry and signals and inflammatory cytokines and senescent cells in any place and all these kinds of specific molecules and chemistry that's going on in our body.

It's a matter of physical structure. What I mean by that is here's here's the how we can all understand it on a on a bigger picture macro level, if I go to the gym and I lift heavy objects on a regular basis for a long period of time, I'm challenging that system of my muscles to by stressing them.

And by doing that, I'm creating an adaptive signal that my body says, Hey, in order to adapt this specific stress in this environment, to better survive this environment that I'm in, because that's what the body cares about. It cares

about survival.

It doesn't care about how much energy you have or how much body fat you have or how much muscle mass you have. It doesn't want to maintain a beautiful esthetic body or a highly energetic body.

It's always actually moving in the opposite direction. It's moving towards the least common denominator, the lowest levels of capacity that are needed to survive that environment.

But if you start subjecting it to stresses that it says, oh, we need in order to survive the demands of this environment, we've got to make these adaptations.

And in the context of lifting heavy objects, the body goes, Oh, well, we need stronger muscles to be able to lift things more easily and to make sure that when we are tasked with lifting heavy objects, it doesn't damage us.

It doesn't damage the the cells, the tissues so much. It also makes stronger bones and stronger tendons as. Well, but it makes stronger muscles. So you grow bigger and stronger muscles. Of course, everybody knows this.

The other part that everybody knows, most of us is, is that if you break a bone and you get a you put a cast iron on that joint and those muscles immobilizing them, two months later, when you go to the doctor and they saw off your cast, your arm or your leg, the muscles have shrunk to half the size and and that's for the exact reason that I just explained that the body is always moving in the direct, the least amount of energy and resources needed to survive the environment.

As soon as you immobilize that arm or leg, the body goes, yes, we don't need to invest all this energy and resources into maintaining all this muscle mass on this leg because it's not needed for survival.

Let's get rid of it. In two months it shrinks to half the size. Now the same exact principle is going on at the level of our mitochondria, the physical structure, our cellular engine.

This is literally the thing that powers the trillions of cells of our body. Think of it as an engine like in a car. It shrinks in most people. If you imagine a 20 year old with a Ferrari V8 engine in their cells, by the time they're 70, most people lose 75% of their mitochondrial capacity, which means that Ferrari V8 engine shrinks to a lawnmower engine. Wow.

Okay, so what's important to understand about that is that that problem is the physical structural problem going from, let's say, 2000 mitochondria in your cells that are each this size to 1000 mitochondria that are each.

This size is a huge physical structural problem. Your physical cellular engine just massively shrank by 75%. Wow. So that problem cannot be solved by taking B vitamins and Coke ten and acetyl l-carnitine and alpha lipoic acid and curcumin and resveratrol and amaan and R and all those other things.

You don't solve that problem by taking those supplements. So what does what you have to understand, first of all, what does solve that problem? In order to understand that, you have to understand what caused the problem in the first place.

And here's the good news. While most people lose 75% of their mitochondrial capacity by the time they're 70, this is actually not a natural, normal product of the aging process.

It doesn't have to be this way. And the reason we know that is because lifelong athletes, exercisers have the same mitochondrial capacity at age 70 as they do when they were young adults.

Okay, that's good.

Breathing, Blood Flow, and Sexual Function

And what that tells us is that the loss, the shrinkage of mitochondria of the cellular engine is due to lack of hermetic stress, lack of challenge, lack of stimulation on that system.

Basically, it's the same thing as the muscle example I just gave a minute ago. If you don't stress that system and provide the signal for your body, we need big, strong mitochondria to produce lots of energy in order to survive the environment we're in.

If you don't provide that signal multiple times a week, at a minimum, if not every day, what happens over months? Certainly over years, certainly over decades.

If you imagine your muscles shrank to half the size in two months, imagine what happens from decades of not providing that signal to your mitochondria.

They shrink, they shrivel up and they literally die off. You lose mitochondria and the ones that are present have massively shrunk in size and are capable of producing far less energy too. The good news is that our mitochondria are malleable, so if we provide those signals to them, let's say we need to produce abundant energy in order to survive this environment that we're in.

They will start growing bigger and stronger again, and they will engage in a process called mitochondrial biogenesis, where you will create more mitochondria from scratch.

And the way we do that is through challenging the system via her emetic stress, via different types of exercise, breath holding practices, heat and cold exposure, fasting and other types of automatic stressors.

That's the key that you have to understand is the most important factor. Dictating your physical energy levels is to what degree do you have a big, strong, robust cellular engine?

To what degree do you have a Ferrari engine in your cells or a lawnmower engine in your cells? I have a whole new understanding now of why they say that the sedentary lifestyles, the new smoking, because I'm going, Oh, well, why didn't they just explain it like you did?

Now that makes sense. Yeah. Oh, my goodness. And there was a third thing that you were alluding to with the mitochondria. So maybe one other layer to this story that I'll mention is that this layer I just explained of the size of your cellular engine also ties into the first layer I explained of whether your mitochondria are operating in energy mode or defense mode.

And the reason why relates to something I call the resilience threshold, which is also in the new book that I'm writing, I call it physiological resilience or stress buffering capacity, energy buffering capacity in this case and what it means is we each have a specific level of demand on the system of stress, on the system that we can handle before we exceed that level.

And then we we get we overwhelm the system. When we get this shut down, the switch from energy mode to defense mode in our mitochondria is when we have a level of stress on and demand on that system that exceeds our level of stress buffering capacity and what's important to understand is that there's there's two players in that relationship.

One is the stress itself. The other is what is your personal capacity to handle stress, to handle energy demand on the system? Because all stress is a is a form of energy demands on the system.

And so is your resilience threshold down here or is it way up here? And that capacity that for for tolerating stress, that stress buffering capacity is largely a function of your the size of your cellular engine, of how big and strong your mitochondrial network is and how robust it is.

So if you have like think of the difference in how a a ten or 15 year old or 20 year old handles any exposure to any type of stress you can think of, whether it's a pathogen, an infection, whether it's physical, over exertion, whatever

situation you want to come up with a toxin exposure, think of how they respond versus how a 70 or 80 year old is going to respond to that same exact dose of that same exact stressor.

This is a difference in their capacity to handle that stress while maintaining high energy levels and easily recovering from it. Okay. So what we want to do, a huge part of youth and maintaining youthful energy levels in particular is maintaining our stress, buffering our energy, buffering capacity at a very high level by maintaining our mitochondria in a robust state.

And that's going to lead to more time, more capacity to handle that stress, which means stay in energy mode instead of triggering the cell danger response where the mitochondria shift out of energy mode into defense mode.

So the bigger and stronger your mitochondria are, the more they will be able to stay in energy mode. Most of the time, as opposed to constantly being triggered into defense mode by the various inevitable stressors of your life.

You just gave me so much more motivation to start working out or to keep work. I do work out as not as much as I said, but now I have more motivation with that explanation.

So well, thank you. And in wrapping up, I know I could talk to you for hours and but in wrapping up, is there anything I didn't ask you about mitochondria that you think is really important for us to know?

There's there's probably so much we could go on for our but yeah I would say I would say focus on these two things, you know, maybe, maybe as an added bonus, I'll mention this one other layer to this story is of of sexual dysfunction is well, let me let me phrase it.

This way. So one one of the key practices that I love, that's a genetic stressor that helps bolster mitochondria is breath holding practices. And this is something I've I've I'm so passionate about this.

I've built a whole program and I partnered with Patrick McCowan, who's one of the world's top breathing experts to build out. This program is called Breathing for Energy.

And we take you through systematic breath, hold training from 15. Second breath holds up to 4 minutes and beyond. And people people get profound. I mean, without getting anywhere close to 4 minutes, in many cases, maybe a minute, minute and a half, 2 minutes.

People have profound shifts in their mood and their energy levels from doing this program. And one of the other benefits that I that ties into this story of actual performance as well is breathing ties in in a number of ways, not only by bolstering mitochondrial health where you have more physical energy levels that will support a healthy sex life.

But our breathing directly ties into the story as well, in an important way, which is when we breathe properly, we generate two things that are very, very important for sexual function.

One is carbon dioxide. We maintain carbon dioxide levels. This is a bit counterintuitive, but we maintain carbon dioxide levels at a higher level in our bloodstream.

And that higher level of carbon dioxide in our bloodstream through something called the BAU effect, facilitates better oxygen delivery to our cells, including our sexual organs.

It's very important for optimal blood flow and oxygen delivery that we breathe properly and and have optimal CO2 levels. The other thing that's really important is nitric oxide.

Nitric oxide also very powerful vasodilator, very, very powerful stimulator of blood flow to the periphery, to our sexual organs. And there's research, for example, on men with arms for getting the exact condition, but it's basically men who have I don't know, maybe I don't think it's deviated septum, but it's some specific oh, it's nasal polyps.

That's what it is. Nasal polyps growing in the nasal cavity that disrupt the ability to breathe through the nose. And by blocking that, people turn more into mouth breathers because they have such resistance breathing through their nose.

So there was at least one study, if not more than one, that's taken groups of men with nasal polyps who have erectile dysfunction and they've given them surgery to remove the nasal polyps.

And as a result of breathing more through the nose, in most cases the erectile dysfunction resolves. Okay, so doing surgery here in your nose allows, your sexual organs to work better.

And the reason this happens is because nasal breathing facilitates blood flow and oxygen delivery to your sexual organs. But I just want to I want to mention this as an added bonus, because not only does training in breathing help open up your airways, help you to teach your body how to breathe much better, which supports optimal carbon dioxide and nitric oxide levels.

It supports mitochondrial health at the same time in overall energy levels. But it's also doing something direct with your blood gases of carbon dioxide in nitric oxide that powerfully supports sexual function.

So I would say especially for people who are mouth breathers or who notice with even relatively low or moderate amounts of exertion, they find themselves switching to mouth breathing instead of nasal breathing very, very important to also really work on your breathing, your breath, training, learning how to breathe properly, and building up your capacity and breath hold capacity.

Oh, my goodness. This is amazing information. I'm going to work on that because I am fortunately in mouth breather. I'm the one who wakes up at night like so. Yeah.

And when I work out. So this is really fascinating. So as always, thank you so much for taking the time to talk with us. And where can people find out more information about you?

I have two websites. One is called theenergyblueprint.com and the other one is humanoptimization.com All right, everybody, make sure you go check it out.

And also, Ari is sponsoring this summit, so go check out any of the links associated with the summit. And they thank you once again, Ari. And everybody stick around because we got more great sessions coming up.