Introduction to mitochondria and energy

Hi everyone. Welcome back to Mastering The Menopause Transition Summit 2.0. I'm your host, Dr. Sharon Stills. You may notice that I'm in not my normal location with my red behind me.

I actually this interview that I'm bringing to you is so important that I'm doing it from a hotel room in Munich, Germany. My guest is also on vacation with his family and I believe France.

And so that's how important this is. So we both got up early and we are here to talk about something really important that is your mitochondria and your energy.

And as you know, I'm a lover of bioidentical hormones and we talk about hormones a lot. And so there are many things that play into your hormonal production.

We know that estrogen has a direct relationship to the mitochondria in your brain and is related to why you may have brain fog or less drainage or congestion or inflammation in your brain.

And so there's many different connections between hormones. But when I want to really focus on today with our guest, Ari Whitten, who is an energy expert, he's a best selling author, his wheelhouse like he's like the professor of mitochondria.

And so what I really want to focus on is the mitochondria and energy because I bet all of you are like, Yeah, me, I could use a little more energy as I'm going through my hormonal journey.

And so we are going to zoom in on that today because you have to put hormones into a body that is healthy. And if you don't have mitochondria that are functioning, then there is no way you're going to have health in your body.

So we're really lucky to have Ari here today. He's a very special guest. He is sponsoring the summit. So without him, this summit wouldn't even be possible.

So let's put up with our if we have a little bit of low bandwidth or a little bit of, you know, sticking in the Zoom room, because like I said, we're coming from location, but we're really happy to have you here.

Ari, thank you for stepping out from your vacation and your family to be here and to support the summit. It's absolutely my pleasure and thank you so much for having me.

You are very welcome. So let's just dive in and just you know, I always like to make the playing field is as even as we can. So for anyone listening who is like Mito who, Mito why, you know, we probably all remember mitochondria from grade school biology next the ATP.

But could you just tell us like your version, like why are the mitochondria so important? Why did you make that your focus in your life's work?

Ari Whittenu2019s fatigue journey and mitochondrial paradigm

Yeah, well, I'll give you a broader sort of personal answer first and then and then we'll delve into some of the specifics around that. So, you know, I had a personal interest in getting into the subject of energy because in my mid-twenties, despite being a very fit, health conscious guy and athlete, all my life, I was dealing with severe chronic fatigue after after getting epstein-barr virus and mononuclear ptosis.

I had about a year of chronic fatigue after that, and I went to lots of lots of conventional doctors and alternative and

functional medicine doctors. And to make a very long story short, we could we could delve into that if you'd like to delve deeper into that.

But to make a long story short, short, I wanted to figure out what is actually the science of energy levels, because I was really totally unimpressed with what I got as far as answers from conventional doctors and even functional medicine doctors who generally just diagnosed me with adrenal fatigue.

And conventional doctors didn't have any idea of what to do with me. And so since I had always had a background in health science, since I was about 13 years old, I figured, well, you know, maybe I'll go study the science of energy levels and fatigue and figure out what's going on here and I spent about four or five years just figuring out one layer of the story after another after another, after another, you know, how is this, you know, I know that sleep is tied to energy levels.

Obviously, we all know if we don't sleep well, that we don't feel much energy the next day. But what are the physiological mechanisms that underlie that?

You know, we know that nutrition is tied to energy, but what are the physiological mechanisms that underlie that? What about exercise? What about circadian rhythm?

What about toxins? What about gut health? What about hormones? What about, you know, all these different layers of the story? And I would spend months and months and months digging into the literature on each of these topics.

And, you know, after several years, I had this list of like 150 different mechanisms that are involved in one way or another in controlling or impacting energy levels.

But but I didn't really have any sort of coherent framework, like in a conceptual framework, a paradigm, to really understand what are the key mechanisms that are controlling energy levels.

So as an example, think of a car where, you know, if you remove any one piece of that car, let's say you take the wheels off, cars not going to work, you take the tires off, the car is not going to work.

You take the pistons out of the engine. The car won't work. You know, there's lots of pieces that are important for that car to function. And if you remove one or another piece, you know, any any number of probably 200 pieces on that car, the car won't function.

And then the same is very much true with the human body that, you know, there are lots and lots of different mechanisms that if they are dysfunctional, can potentially impair energy levels.

But what what I was really after is what is the what are the key mechanisms? What are the most upstream mechanism mechanisms that are not just necessary for things to function, but are actually deciding whether or not we're fatigued or energetic, which are regular leading energy levels.

And and in the same way that a driver in the car, you know, you could say that the wheels are not the thing that's controlling whether the car is driving down the street and how fast it's going.

The exhaust system isn't controlling how fast the car is going. The pistons aren't controlling how fast the car is going. It's the person sitting in the car deciding whether to press the accelerator, pedal or the brake that is actually regulating whether that engine is turned on and how fast it's driving.

So what I was interested in is what is that system in the human body, what's controlling thing sand regulating it? And it wasn't until the work of that I stumbled across the work of Dr.

Robert Naviaux, who is a he's a physician and research scientist at the University of California, San Diego. He runs a lab for mitochondrial medicine there and mitochondrial research.

He does a lot of research on autism spectrum disorders, chronic fatigue syndrome and all things related to mitochondria. And many years ago, several years ago, he published a paper called The Cell Danger Response.

And that was the paper that made everything mate, made sense of everything for me because up until then, I just had, as I said, this kind of list of hundreds of 150 different mechanisms of all these different systems of the body and all these different biochemical pathways that were in one way or another related to energy.

But it wasn't till I found his work that I had a paradigm to understand things, and that paradigm put mitochondria at the center of things and you know, mitochondria the way we were taught about them in our high school and college and graduate school, biology and physiology courses in biochemistry courses was really always as this sort of, you know, we're taught that they're the powerhouse force of the cell.

You know, that's what everybody remembers it. Mitochondria is the powerhouse of the cell there. And organelle that is involved in cellular energy production and and we got to remember powerhouse of the cell for, you know, multiple choice exams.

So when they tell you which of these organelles is the powerhouse of the cell, is it the Golgi apparatus? Is it the lysosomes? Is it the mitochondria, you know, to check the box next to mitochondria?

And that's really all people remember. And for the most part, they're taught about in physiology and biology courses as sort of these mindless cellular energy generators that just take in carbs and fats from what you eat.

And they pump out energy in the form of something called ATP adenosine triphosphate, which is the energy currency that your cells run on. So what Robert Naviaux work did was and what we now actually have a couple of decades of work really showing that mitochondria are not just mindless energy generators and are vastly more important in human physiology than we realize that they're very much at the core of our risk of all kinds of diseases where, you know, how healthy are mitochondria are functioning is a huge determinant of our risk of cancer, our risk of heart disease, our risk of neurodegenerative diseases, and a long list of other diseases and even, you know, of course, our energy levels, what could be more central to our energy levels than than our cellular energy generators.

It's central to our resilience to stress, to exposures, to stressors, which is something I hope we get a chance to talk about. And and it's it actually influences heavily the rate of aging itself at the cellular level.

So we now have decades of research showing that, you know, this one little organelle, these sort of mindless cellular energy generators that we were taught about in biology and physiology courses are actually way more important than we ever realized.

And in the work of Dr.

How mitochondria sense stress and trigger fatigue

Robert Savio, he positions mitochondria as what he calls the central hub of the wheel of metabolism. Metabolism is the total. You know, we think of metabolism as this sort of word that's related to weight loss.

But actually metabolism really means that all of the biochemical reactions that occur in your body, everything is your metabolism. So he said mitochondria are the central hub of the wheel of all of the different chemical reactions, biochemical reactions that occur in whole body.

Mitochondria are at the core of it. And the other big aspect that comes out of his work, which relates to what I was talking about before, is first looking for this thing that's controlling and regulating human energy levels well as the central hub of the wheel of metabolism, they are the most upstream thing.

They are the thing that's that's making decisions on what how what kinds of reactions, what are the levels of different chemicals, neurotransmitters, including hormones, to a large extent that the body is going to have in it in accordance with the signals it's getting from the environment.

And here's the core of what I mean by that. To summarize his work very quickly, mitochondria essentially have to roles. One role is as energy generators, as we were always taught in high school and college biology courses, they take in food, energy and they pump out cellular energy and that's one of their roles.

The other big role that they have is as cellular defenders as more accurately as environmental sensors. They are sort of the canaries in the coal mine of our body and that that are constantly asking the question, is it safe for us to produce energy?

So they're taking samples of what's going on, what are the signals in the body from the environment and and saying in response to that, are we safe to produce energy?

Is is there is the environment safe? If so, we are going to operate in energy mode and produce lots of energy. If we are detecting that the environment is unsafe, we're going to turn down the dial on energy production and shift resources towards cellular defense.

So again, that there's two roles of mitochondria energy generation and coordinating the response to threats, energy generation and cellular defense. And those two roles, it turns out, are actually mutually exclusive.

So to the extent they are doing one, the other one is turned down. To the extent that your cells are having to defend against threats, they are turning down the dial on energy and shifting resources towards cellular defense.

So once I got that paradigm, all of the several years of work that I did prior to that now fit into a conceptual framework that I made sense of everything.

Okay, now I know mitochondria are actually coordinating and regulating all of this and they're influencing the body's response in all of these other 150 mechanisms as far as how the body is functioning in response to its environment.

Perfect. When I sat on, I was telling Ari, we sat on a on a board together, talking, you know, answering questions like a Q&A board. And we called him Professor Ari during the during the session.

So I love this because I can just kind of sit back and let you let you teach us about mitochondria. So for the women listening, they might be thinking, you know, what kind of threats?

What is he talking about? So could you define some of the threats that you're you're speaking of? Yeah, absolutely. So mitochondria don't have a receptor for every different conceivable type of threat.

They don't have a receptor for this toxin, toxin receptor for psychological stress, a receptor for sleep deprivation. They they don't have a receptor for every different type of stress.

But it turns out that they can actually detect basically any type of stressor imaginable, everything from toxin exposures to sleep deprivation to psychological stress, to poor nutrition, to any to let's see what else to infections, to injury, basically, you name it, any type of stressor that you can think of, mitochondria can detect that signal.

And the reason why is is again, not because they have a receptor for every different conceivable type of stress, but because ultimately all of these different types of stressors, whether it's an an exposure to an environmental toxicant or sleep deprivation or an infection or whatever else they eat, for the most part, converge on a few different mechanisms.

They're converging on oxidative stress, inflammation and immune activation or cellular damage. And often those things are very much overlapping and tend to go together.

But basically whenever there's a big increase in the levels of oxidative stress or oxidative damage or inflammation or or cellular damage, basically those are the signals that are then translated into mitochondria.

They pick up on those signals and the mitochondria say, Hey, we're under attack, there are dangers present. Let's let's conserve our energy. Let's turn down the dial on energy production and shift resources to coordinating a response to these threats.

So think of it. You know, if all of this sounds abstract, let me sort of ground this in a couple simple, very practical observations. You can think of this general idea as akin to what a bear or many other animals does in response to winter, in response to the the harsh environment coming.

And the bear says, well, I don't I don't want to waste a bunch of energy to try to survive this harsh environment for several months. What I'm going to do is turn down the engines and I'm going to rest and I'm going to conserve energy to try to survive a harsh environment.

And it turns out that that basic principle is actually universal among basically all animal species and many types of plants and many other types of organisms, microscopic organisms, when they're exposed to harsh environment or conditions, they turn down the engines and they go into arrest in some cases.

And some animals, like certain worms or tardigrades microscopic organisms that are ubiquitous, they go into a state of dormancy. They like almost you can imagine it being almost dead, but still technically alive and and then when the signals from the environment are, are communicating that the environment is safe again, they turn the engines back on and they come back to life.

And another simple way of thinking of of this is, you know, just think of the last time you got a an infection like a cold or flu or COVID or something like that.

What's one of the classic signs of getting an infection fatigue? That's that's how your body is designed. It's designed to conserve energy when it's under attack.

And it is actually maladaptive. This is what people need to understand. This is an intelligent response by the body. It is maladaptive to expend lots of energy and to be motivated to go run around.

If the environment is harsh, if your body is under attack, the body wants to protect itself. So it it's saying let's let's shelter ourselves, let's conserve energy.

We're under attack right now. Let's let's wait for the signals from the environment to be safer before we turn the engines back on. And I'll give one more example to to help make this a little more understandable.

Just imagine you're in the kitchen preparing dinner, chopping vegetables. You know, you're making you're preparing the chicken, whatever you're doing.

And somebody walks in with a gun and says, Hey, give me all your jewelry. Give me all your money, okay?

Why mitochondrial capacity declines with age

You're not going to sit there and keep, you know, continuing to chop vegetables and go about your dinner preparation process as normal. You have to stop what you're doing and deal with that threat.

And that's what the body has to do when it's under attack. It stops the preparation, it stops the the normal processes of peacetime mode and energy production mode.

And it shifts it shuts that down or turns down the dial more accurately and shifts resource resources towards defending against those threats. So it doesn't matter whether it's psychological, logical stress or sleep deprivation or poor nutrition or exposure to environmental toxins or infections or any or physical overtraining even or any number of other stressors or combinations of them, that the universal response to that is to turn down energy production and shift more resources towards cellular defense. Yes.

So it's really the question is really why am I fatigued? I know a lot of us beat ourselves up when we don't feel good and we're tired and we just want to push, especially as women.

We've kind of been trained to do that. But I always think of the mitochondria, you know, they come through the matriarchal, the mother's lineage. And so this is the wisdom of the mother.

If your child is sick, you wouldn't be like, get out there and play or go to school, you know, come on, honey, go to bed and we'll tuck you in. And here's your chicken noodle soup, gluten free.

So, you know, this is wisdom in the body. And we have to start looking inward and asking ourselves, you know, why is this going on? What is the threat?

And like Ari's saying, you know, these threats are multifactorial. They're not just on the I have a mold exposure. They're also on the life style and my not nurturing myself and making bedtime a priority.

Am I not getting my feet on the ground? Am I not seeing the sun, etc., etc.? And so it's this real wonderful opportunity, which is why I always say menopause.

Emphasis on the pause is this time for you all to pause and look at your energy levels? Have you just been saying, you know, this is normal? You know it's normal.

I wake up tired, I just push myself. It's normal. I drop during the afternoon and it's hard to focus and I've got to reach for some sugar or something.

We we want to look at what might you might think is normal, but it's not really normal. It's just common. And so this is an opportunity for you to start looking.

So my next question for you is what do you recommend for women listening who like the next thing would be like, well, how do I know if my mitochondria like, how do I know?

So what would you say to someone listening? Like how do they know that mitochondria are the issue or are they always the issue? Yeah, well, you know, there's there's several different tests that have emerged that are kind of fancy tests.

There are certain indicators that you can get from a standard blood test that might indicate severe mitochondrial dysfunction. And there's, you know, the mitosis swab and organic acids testing and a few other testing.

But the truth is the harsh truth is that most of these tests aren't that great and they're pretty limited in actually what they can even determine and discern about what's going on with your mitochondria.

And I would argue that the the simple presence of the symptom of fatigue is a sign that your mitochondria are not working optimally and that is, to a large extent, all you really need to know.

I mean, if you want to pay several hundred dollars or thousands of dollars to do a round of testing, to to get specific insights into, you know, say something, you know, a piece of paper that says, hey, your mitochondria are not functioning optimally.

That's fine. Organic acid tests can sometimes give an indication of certain nutrients that are deficient that relate to mitochondrial dysfunction. But all of those tests are actually limited by one really big factor, and that is that they, to a large extent, you how your mitochondria are functioning, but they don't actually give you that much input into the state of your cellular engine itself.

And what I what I mean by that is we have I want to make a distinction, something that I've never really heard anybody else talk about I think is extremely important.

And that is there is there is a difference between how your body is functioning in this moment and what is the status of the equipment and of your body, meaning let me let me put it this way.

There's a difference between a car with a, you know, a moped engine in it and and a vehicle V8 engine in it. And if you just change the oil or the gasoline or lube, the different parts on that car with the moped engine in it, it's still got a moped engine.

And you can change of the signaling pathways, but you haven't changed the engine of that car. So one aspect of what we need to work on is what's going on signifies and you know, the nutrients we're eating, whether we consume more vitamins and minerals, lots of different aspects of that.

Even even things like sleeping, optimize the circadian pathways, taking off the stress load. So, you know, meditating and doing yoga to ease our stress load.

All of these types of things can alter the signaling pathways in our body the different biochemical, hormonal neurotransmitter pathways, all of really important.

But there is something that's equally important that is almost, I find almost never emphasized, which is that we need to change the physical machinery of our body that like the actual parts, the, the, the physiology of what's there needs to also be altered.

And let me be specific about what I mean. There's research showing with each decade of life after someone dies adulthood, most people lose about 10% of their mitochondrial capacity.

And maybe that doesn't seem like much, but let me put it in a way that that will seem impactful. The average 70 year old has lost 75% of their mitochondrial capacity, and that's that's their cellular engine.

This is literally the part of, you know, virtually all of the energy that power, virtually all of the truly ls in your body, from your muscles to your bones, to your skin cells, to your eyes, to your brain, to your heart, to your lungs, to your liver, to basically everything.

Virtually all energy comes from mitochondria and most people, if you think of mitochondria as being synonymous with the cellular engine, okay, this is this is this is your cellular engine.

And where the energy comes from. And if most people are losing 75% of this, by the time they get to be three years old, that means that most people are going from a V8 engine in their cells when they're to a moped, engine in their cells when they're 70.

So even if you change the signaling, you change the amount of vitamins and minerals have in your body, you change you could even hormones, you could change neurotransmitter pathways.

Hormones are a particularly powerful thing to modulate as far as a signaling compound, but a lot of these things you can change, but you've still got a moped in there.

You haven't you haven't changed up. And and so your brain cells, your heart, your muscles are still trying to run on a pet engine, even with more optimal signaling pathways being, you know, operating in a healthier state.

So all of that might sound really depressing in that most people are losing so much of their their physical cellular engine. The good news is that it's dynamic and it's actually not a natural product of the aging process itself, meaning it's not determined by aging in human biology.

Everyone loses this amount of their cellular engine by the time they get to age 70. It's not genetically determined. It's and it's not even natural, actually.

And the reason we know this is because when we look at 70 year olds who are lifelong exercisers, they have the

same mitochondrial capacity as young people.

Right. And and the reason why what's going on here is that actually this process is a process of mitochondrial atrophy in response to those organelles not being stimulated, not being challenged.

The right way to think about this is if you if you've ever broken a bone, you've broken an arm or a leg. Eight weeks later, you go to the doctor and you get the saw sawed off your leg and and you're down at your leg and it's size of the other one, literally in the span of just eight weeks, all of those muscles shrank to half the size.

Exercise, sauna, and zone 2 training for mitochondrial health

And the reason why is because the body is a machine that is tuned for survival. It only cares about survival. And as soon as you put a cast on that leg and immobilized it, basically the body, I guess we don't need all that muscle anymore to survive our environment.

Let's get rid of all this energetically costly tissue because it's just a liability. It doesn't help us to survive the same exact process internally at a lower level with our own Drea.

And they are it's it's essentially energetically costly tissue that is a liability for survival if it's not being used. And so the body is constantly a process where it's trying to get the least amount of mitochondria possible to survive in its environment.

So it's constantly getting, trying to discern what environ and it's in what amount of mitochondria are needed to survive this environment optimally. And it will constantly call things down to the least amount of mitochondria possible.

And the same is true with our muscle tissue. Your body will constantly try to have the least amount of muscle tissue on it possible to survive the environment it's in.

The only way to grow that muscle tissue is to provide that signals that more muscle is needed. How do you do that? You lift heavy things, right? That's the signal, the adaptive signal that your body says in order to survive this environment, I've got to carry more muscle.

I've got to get more. I have to be stronger. I have to have more muscle to better survive this environment. And if you don't have that signal, your body will constantly be trying to get rid of muscle tissue.

The same exact principle is true at the mitochondrial level. If you are not providing the signal that your body needs more energy to survive that environment, it needs more mitochondria to produce more energy for energetically demanding tasks.

The body will call the mitochondria well, it will it will decrease the amount of mitochondria. So that's the fundamental reason why most people are losing half or 75% of their cellular engine as they get older.

So as I said, the good news is it can be rebuilt and the way we rebuild it is with exposure to energetically demanding tasks and specifically for medical stressors, things like exercise.

Of course there are many different subtypes, subtypes of exercise as well as heat and cold things like sauna and cold exposure, as well as things like fasting and breath holding practices.

And there are several other types of automatic stressors as well. Mhm. All right. Well good to end on a high note and not on a and a depressing note. There's, there's always, it's never too late.

So, you know, if you're watching and you're in your sixties and you're thinking dang I've already, you know, it's never too late. Like he just said, we just have to get that hermetic stress and all these lifestyle things that we, we talk about and you can start rebuilding.

So, you know, just if you could maybe pick like your favorite or top two or three things, you know, we're going to wrap up soon. But just like for the women listening, if they're like, I've got I need some hermetic stress in my life, what would you say?

Like are the the biggest bang for your buck that that you think we should all start doing? People have heard this before, but it's it's worth mentioning.

Exercise. Exercise is the most potent medicine on earth. And there's that you know, I have some interest, some quotes from researchers that have looked at this where they've said, you know, when they're looking at what it does to animals, when they're and they're looking at the cellular machinery, I just want to make the point that there are things that exercise does to your physiology, that no drug can do that no hormone, no neurotransmitter, no vitamin, no mineral, no supplement can do.

This is changing your physiology and in a profound way that extends lifespan and also prevent disease. And I'll put it this way if there were a drug pharmacy that could do even half of what exercise does, support your physiology and support your brain function and support your physical function, prevent disease, increase longevity and health span.

If there were that could do even of what exercise does for you, it would be considered the most amazing ethical drug ever created. It would be the biggest blockbuster selling drug ever.

Every physician would prescribe it to every one of their patients, and your physician would look like would look at you like you, an absolute nutjob, if you were not doing taking this drug every day.

Okay. And that's literally what exercise is. We also know that sauna exposure. We have research showing that as a study out of Scandinavia, where the sauna tradition has been very strong for a long time, where they've shown that people who use saunas more multiple times a week, up to seven times a week, up to one daily, have manic reductions in in basically all the major cardiovascular disease and neurological diseases and even all cause mortality risk of dying from from any cause those drops off by about 50 to close to 70% in some cases with people who regularly honor five or seven times a week.

So saunas, heat, exposure, getting your body uncomfortably hot for 20 or 30 minutes a day is absolutely one of the most potent medicines in existence.

And everything I just said about if the benefits of exercise were in vogue, how would that be? The same exact thing is true with sauna exposures. It's something that reduces your risk of numerous diseases, enhances your physical performance, conserves muscle mass, improves body composition, improves markers of metabolic health and systemic inflammation, even increases sports performance and enhances your recovery from exercise and mentally reducing depression.

I mean, the benefits go on and on and on. I'll mention I a couple quick things that I'll mention. One thing that I should mention on exercise, single most fun type of exercise that you can do for rebuilding your mitochondria, for going from moped engine back to youthful V8 levels of cellular engine is is what's called zone two endurance exercise and Zone two is in reference to the intensity level of that exercise.

And you can measure that as a proxy. You can use heart rate. It's not a perfect way of doing it a little bit better way, but is more of a pain in the butt is measuring your blood lactate levels but heart rate can be used as a proxy.

It just differs a bit depending on the type of exercise. Whether you're doing something like more biking versus running, it can differ. But doing zone two cardio 3 to 7 days a week in about 45 to 60 minute sessions is absolutely critical.

And we know from the research of an exercise physiologist named Inigo Sound Milan, who who looks at two sides of the metabolic spectrum in his laboratory.

One side is endurance athletes, which he considers the peak the pinnacle of metabolic health and based on, you know, objective markers. And the other side is people who are obese, insulin resistant people with metabolic syndrome.

And we know from that research that people who do endurance activities, people who do a lot of them are have literally 400% have 400% more mitochondria.

Okay. Well, for we're not talking about 10%, 20%. This is not something that has a very small magnitude of effect where I could say, hey, this this slightly increases your levels of cell.

And so we're talking about literally 400% of the size of the cellular engine in these people versus these people. And the way to do that is by building it, you build that cellular engine through your actions, through your behaviors.

So the way to go from, that moped engine back to a V8 engine is especially through zone to endurance exercise. But all that were medic stressors. Well, to some extent, build that.

And then the last thing I'll mention very briefly is breath holding practices, especially for people with chronic fatigue. I find that sauna and breath holding practices, people who who have debilitating chronic fatigue, who are exercise intolerant.

The best place to start is with sauna very gently at lower temperatures, easing into it very slowly and with breath holding practices again, very gently easing into it slowly and breath holding practices have absolutely amazing research on them, showing profound benefits, reductions in all kinds of different diseases, reductions in anxiety improvements in sports performance, that the list goes on and on and on.

But I think breath hold practices are one of the most powerful things that we can do to support our health and reduce the risk of disease and increase our energy and our resilience to stress.

Yeah, we hear a lot of about breath work, but we don't hear about breath hold. And so for the women who want to know more about that, how do they find out?

You can go to my website. I have a program called Breathing for Energy that is really structured all about, you know, it's a systemic, progressive program in breath hold practices.

So it goes from taking people, even if you're all the way down at, you know, oftentimes with people with chronic fatigue syndrome, they're only able to do 10 or 15 second breath holds.

So it starts there and goes all the way up to four minute breath holds and beyond. And I find very, very consistently that this is, I think, one of the most underappreciated.

And if you want to use the word secret, just because of how few people know about it and talk about the science around what's called hypoxia and hypocalcemia, hypoxia is low oxygen states and hypocalcemia is high carbon dioxide states.

When we train those states in our in our body where we literally alter the levels of oxygen in our blood and carbon dioxide in our blood, our body is designed to to to respond with many, many different adaptations that have just incredible benefits.

So I think what I've seen is that people who do that practice and who over the course of a month or two months go from know 32nd breath, holds up to two minute breath, would see remarkable huge changes in their energy levels in their result resilience in their mood and brain function.

I mean, it's just what's cool about it is that you can measure it so easily.

Breath-hold practices and closing takeaways

You can see the improvements so fast and that it translates into big improvements in things like energy and resilience and mood literally in just a few weeks.

I love that. And you know, ladies, I'm always saying not all medicine comes in a pill bottle. And I always say your breath is your best medicine and it's it's what brings you into the world.

It's how you leave this world. It's free. It's always with you. So harnessing its power is, you know, it's like, come on, it's right there. And so now this is a a different way.

We're not just talking about breathing, we're talking about holding and all these benefits that Ari's been talking about. So this is just been fantastic.

I told you it would be like a little mini course from Professor Ari and the mitochondria and energy. And so is there any last things you want to share before we wrap up and get back to our vacations?

Yeah, I just want to reemphasize one point which is, again, I think people are kind of locked into this mentality where we are looking for a pill or a substance to change the way we feel.

And I want to just draw people attention back to this distinction between altering the signaling of what's going on in the body's machinery as it exists now, which is what most people are trying to do, versus actually changing your machinery, actually altering the physical structure of your muscles, of your bones, of your brain and the mitochondria in those trillions of cells through or medic stress, we can we can change literally the machinery in our body.

And you can literally go from having moped engines in your cells to V-8 engines in your cells. And I find almost universally that even though most people almost never talk about this or think about this, that this is actually a much more powerful and effective way to change our physiology than forever trying to reach for a substance, whether it's a prescription substance or a natural substance that is trying to change the signaling of our bodies current machinery.

So just remember, your body is an intelligent, dynamic, adaptive system, and it is constantly responding to whatever environment it's in, trying to optimize for that environment.

So use that use that fact to your advantage. Provide the signaling that makes your body better every day, makes it stronger, makes it smarter, makes it more energetic, makes it more resilient.

And for medics, stress is a huge, huge aspect of doing that that most people are missing or not doing optimally. Beautifully said. Yes. It's why in my my office, you don't get your hormones prescribed to you unless you're doing all these other things, because you can't just take hormones and put it into a body and a lifestyle that's not participating.

So you get your hormones when you behave and do all these other things. I'm saying basing on the icing on the cake. Thank you. Yeah, that's great. I love that.

So much for being here. We're we're going to have some special things with Ari after the summit. And so stay tuned because obviously he's a wealth of knowledge.

And so for those you said you have a website. Can you say your website name again? Yeah, the website is theenergyblueprint.com Okay. And then are you active people to follow you on social media or anything?

Not so much. YouTube is probably the best place. Okay. Okay. All right. So go check out his website because you can learn a ton from him and we all want more energy.

And this whole idea of, you know, we always say like, well, I'm not going to hold my breath for that, you know? But like now we can look at holding our breath in a very positive way and that it can actually enhance our health and

enhance our energy.

So always learning something new. Thank you, Ari, for being here. Thank you everyone else for being here. And I know there might have been a few parts where it was a little shaky, but the information is golden.

And so just go back, listen to it again, take some notes if you really start to implement and follow through on what we talked about here today, your life will change, your menopausal transition will change, and you will be 90 climbing mountains with me. So we'll be back with another interview and stay tuned.