Introduction to Energy and Mitochondria

Hello and welcome back to our Reversing Mast Cell Activation Syndrome and Histamine Intolerance Summit. I'm your host, Dr. Meg Mill. And today I'm joined by my esteemed colleague, Ari Whitten, who is a best selling author and the founder of the Energy Blueprint.

And we're going to talk all about energy. Isn't that something that most of us feel that we're lacking? So we're going to actually dive in to the mitochondria.

We're going to talk about the Cell Danger Response. And when we have mast cell activation syndrome, we enter into the Cell Danger Response which affects our mitochondria.

So we're going to talk about our cells the mitochondria and how to get your energy back. So thank you so much for joining us today Ari. Thanks so much for having me.

Absolutely. Well, I am excited to get into all things low energy mitochondria function, all of that, because, you know, so many of us are experiencing fatigue all the time. And it really is.

You know, that's actually one of the most common complaints that I hear is just that I am exhausted all the time, and I don't have the energy to do the things that I want to do in my life.

So I'm excited to really dive into this and have you help us really understand the physiology behind some of this. Awesome. I'd love to. Yes. Well, before we get started, can you I'd love to just share a little bit of background of how you got into being the Energy Master, the Energy Blueprint.

Yeah, the the very, very short version of that story is, you know, I've been a health geek pretty much all my life since I was a little kid. you know, I've been an athlete since I was 5 or 6 years old.

And when I was a teenager, starting when I was about 13, that turned into a strong interest in fitness and in bodybuilding and and learning everything I could to enhance my physiology, to become a better athlete, to become more fit, to change my body composition.

So starting from a very young age, I was very heavily into experimenting with my own physiology, you know, doing biohacking a couple decades before biohacking was a term.

The original biohackers were bodybuilders. You know, bio bodybuilders were back in the 1960s and 70s or injecting themselves with all kinds of chemicals, sometimes killing themselves, you know, by injecting the wrong chemical and, and experimenting with, you know, they were on the cutting edge of biohacking again before biohacking was a thing.

And so that was my world from a very young age.

Ari Whittenu2019s Background and Shift to Energy Science

And I went on to do a degree in exercise science and went on to do a master's degree in nutrition. and was a personal trainer and nutritionist for many, many years.

I've worked with thousands of people, and so my background is a bit different, than I'm probably most of the speakers on the summit. And in general, a lot of the health experts out there in that my background is not so much in pathology and in pharmacology.

Right? The study of disease and in pharmaceuticals to treat disease, which is what in a conventional medical education dominates in whereas they receive almost no education in nutrition or exercise science or lifestyle.

You know, I've, I've had since I was a kid, roughly 30 years now of lifestyle science, health science, and, you know, optimizing human physiology experimentally, experientially, rather than sort of, trying to undo pathological states, undo disease states.

so there's an interface between the two. Interestingly, I've found that. They are really siloed off. They're really seen as disconnected things. the study of how do we undo disease states is treated as a totally different field of science compared to the science of human health.

Right. Like how do we actually build health and performance and fitness? You know, that's the realm of exercise science over there. And here's the realm of MDS and pharmaceutical companies over here.

Right. But the reality of human physiology is they are largely one in the same. We're discovering in recent years this is a revelation for some. But the most effective medicine that we have in the world is exercise.

That's the best medicine, and it is vastly more potent than any of the 19,000 FDA approved pharmaceuticals in existence as far as, helping us to ward off disease and have a longer health span and a longer lifespan.

So, these things are connected even though we treat them as siloed off things. If I have a disease, I go to this doctor who's trained in pathology and pharmacology.

I don't go see the person who's trained in exercise science and nutrition, but this is actually wrong. we should be the most effective tools we have to be healthy, our nutrition, lifestyle and exercise.

And, you know, that's so that's that's my background. And, I, I'm, I'm not qualified to go perform neurosurgery or diagnose somebody with disease or prescribe a pharmaceutical for them.

But I know a lot about how to be healthy. Yeah. It's very well sad. I actually went with someone I was working with asked me that just yesterday. She said do you think things will change.

Do you think our system will change. And I said, you know I would love to say yes. And I think people are becoming more and more knowledgeable like the Our summit reviewers that want this information.

But as long as pharmaceutical companies and insurance companies are, you know, really running health care, a lot of the health care, it's their systems, then we're not going to necessarily see what you're saying.

And it's very needed. We need to be looking at that whole spectrum because you don't need the drugs often if you're doing the things before, sometimes you get to the point you do need them.

But there's so much gap in what we can do. I agree with you totally. Yeah. I mean, here's another way of stating it in in very concrete terms, about 80% of the diseases of the chronic disease burden in the United States are diseases of nutrition and lifestyle.

what kills eight out of ten of us? Diseases of lifestyle? yet we go to see physicians who receive somewhere between 0 and 5 hours of coursework in nutrition and lifestyle.

this is probably something wrong with that. You know, there's there seems to be a gap there that is so large as to be incomprehensibly absurd. and as you said, it's it has a lot to do with financial incentives.

so, you know, my background was athletic optimization and fitness and body composition, for, for a long, long time. And then in my mid 20s, I got Epstein-Barr virus and I got mononucleosis.

And I was left with, with chronic fatigue for about a year after that, which was a very unusual thing for, for me,

because I had always been Mr. Fit Guy, Mr. Healthy Guy, athlete into fitness, eating healthy, and I went to conventional doctors.

I went to alternative and functional medicine doctors. Conventional ones generally had nothing to offer me. And the alternative and functional medicine people generally diagnosed me with adrenal fatigue.

There's I have a whole long story of down the adrenal fatigue rabbit hole. But the very short version of that story is I ultimately discovered that adrenal fatigue doesn't really have much of a scientific basis.

and that conventional medicine is actually right in their assessment of that. The conventional medical, medical, doctors and endocrinology chronological societies brush off the diagnosis of adrenal fatigue as sort of nonsense and quackery pseudoscience.

I was really annoyed at that at first because I thought they were wrong, but, it turns out that they're right in their assessment of adrenal fatigue.

Cell Danger Response and Mitochondrial Function

and ultimately, what I found is that nobody, no group of, of health experts or paradigm of medicine or health really had an adequate scientific understanding of what controls and regulates human energy levels, why some people have chronic fatigue, why some people are bursting with energy.

And, once I discovered that, I shifted my focus again through my own personal suffering as a catalyst having chronic fatigue, I shifted my focus away from fitness and body composition and athletic training to the science of energy.

And that's what I've been doing for almost 15 years now. That's great, I know, and the personal journey makes us so passionate about what we do. I think it brings that interest and passion.

So let's I you know, I know that your studies have led to the mitochondria, the foundation of energy in ourselves. So can we get a little bit into telling?

I mean, we have a fairly educated audience here. I know, but just kind of if people don't understand what actually is a mitochondria and how it affects you.

Sure. let me I'm going to zoom out for a second. So, you know, as, as I discovered, I, I, I spent about a year of my life looking into the science on adrenal fatigue, convinced that I was going to find scientific, scientific, a scientific basis for why adrenal fatigue is legitimate.

And at the end of it, I really was kind of shocked and dismayed to discover that I found the opposite. I found lots of studies that really prove to me that that my bias was wrong.

The problem was at the end of that, I was left with, okay, what the hell is going on in energy if it's not adrenal fatigue, what is it? And, you know, I had a background in nutrition, so I knew nutrition was somehow tied to this energy story.

I spent a long time building out the the mechanisms of how nutrition relates to energy, trying to piece things together. I knew exercise was tied into this story, so I spent a lot of time digging into that.

That sleep and circadian rhythm were tied. So I spent a lot of time there that toxins were tied into the story and lots of other factors. and ultimately, I kind of had this, this really long list of like 150 different physiological mechanisms and pathways that were, in one way or another, tied to the energy story.

but it it wasn't really until I found the work of Doctor Robert Navajo, who published a paper called The Cell Danger Response that I had any sort of coherent paradigm of what is actually regulating energy levels.

Like, if you think of a car, there are lots of parts of that car that are necessary for it to function. Like if I remove the spark plugs, the car is not going to function well.

If I remove the wheels, it's not going to function well. If I remove the engine block, it's not going to function well. There's lots of parts that are necessary but don't necessarily regulate and control.

Like what is the most upstream thing that controls whether or not that car is turned on or off, or how fast it's driving, whether the accelerator pedal is being pushed or the brake is being pushed.

In this case, it's like a human being in the car controlling those things. But in our physiology, what's controlling it and Robert Navios work, and he's a scientist who runs a lab for mitochondrial medicine, at the University of California, San Diego.

I've had the pleasure of interviewing him and actually going to his lab in San Diego and spending some time with him there. And I think he's one of the most brilliant scientists of the last 50 years or so.

and basically what this paper was, was it was pulling together really decades of research from researchers all over the world on mitochondria, showing that mitochondria are sort of are much more than we imagined them to be.

You know, when we took high school and college and graduates for physiology and biology courses, we're learning about them as sort of they're the powerhouse of the cell.

That's that's what we all remember. but we learn about them as these sort of mindless energy generators. They take in carbs and fats, and then they go through this process electron transport chain, bada bing, bada boom.

Now you pump out ATP. So carbs and fats in ATP, adenosine triphosphate out. That's cellular energy. And that's kind of the story of mitochondria. but what the cell danger response paper from Doctor Nabeel showed was that mitochondria are much more than mindless energy generators.

They are actually environmental sensors. They're dangerous sensors. And so not only are they the thing that is producing the energy, they're the thing deciding whether or not to produce the energy, deciding how much energy to produce at any particular given moment, and the way that they decide that is essentially a function of how much danger they perceive the body to be at, whether they perceive the body to be under attack or under threat of some kind, or to be in a safe environment.

Doctor Novo calls this piece time, metabolism and war time metabolism. Right. So there's sort of two modes, and it's not an on off switch. It's not a binary. It's more like a dimmer switch.

you can be in in between. But we have these sort of two modes of either you're in peacetime metabolism and the mitochondria are producing abundant energy in a safe environment, or they perceive the body to be under attack, in which case they turn down the dial on energy production and shift resources towards defense mode.

Right. And certainly something like mast cell activation in immune response of any kind, defending against something that's perceived as an antigen or something that's perceived as a threat, is is very much overlapping with this idea of the cell danger response.

Right. So to the extent we are dealing with threats that the body is at the biochemical level, at the cellular level, responding to and trying to defend itself against threats is the degree to which we are shifted metabolically at the, the, the, the cellular level, at the mitochondria level, at the bio energetic level, the degree to which we are shifting out of energy mode, towards war mode, towards defense mode.

And these two functions are mutually exclusive. So to the degree that you have to defend against threats is the degree that you will not feel abundant energy.

Which is really. And when you have muscle activation syndrome, you're always feeling that you have your under

attack. Everything becomes the error becomes a threat, water becomes a threat, supplements become a threat.

And so now many people are dealing with this all the time. Yeah. And and how you know, you're given that you're much more of a marcel activation syndrome expert than I am.

How do you perceive the process of of, sort of calming that down, calming that down. So the body is not constantly granulated mass cells and responding in that way because that process of calming that down is also going to be critical to allowing the mitochondria to shift back into energy mode.

so we really look at it in a, in a multiple pronged approach. So, you know, we're looking for the invaders, like you had mentioned, the toxins, the, you know, really working on gut health, finding all of the, you know, a mold, looking at the invaders that are really at making the mast cells activated.

And then at the same time, we're also, you know, we're also doing some Marcel stabilizers to calm the mast cells down at the same time. And then we're also doing some nervous system work and really doing some limbic retraining, you know, really trying to get your body back in that parasympathetic nervous system.

So we're kind of working on all three of those things simultaneously to get everything to calm down. So your body is not feeling like it needs to react to everything.

So when we're pulling the invaders out and really rewiring the nervous system at the same time, we see success to be able to really relax. But you need to have different approaches kind of going on simultaneously to start to see some of that. Calm down.

Yeah. Awesome. So you know, the way I see energy, the energy story is there's sort of two key aspects to going from fatigued to highly energetic. One is all of the process that you just described, which is a function of finding the triggers of, what's triggering our physiology in a bad direction and what's what's causing a problem in some way, and trying to, as much as possible, minimize and eliminate that allostatic load, that total body stress load, whether it's from poor nutrition or poor gut health or psychological stress or, whatever toxins or whatever else.

the other process that's really important when it comes to energy is. We have to understand that mitochondria are not a static thing in our body. They are, you know, we have this tendency to kind of look at physiology as like our body consists of this part and that part and this part.

Rebuilding Mitochondria Through Stress and Recovery

And they just sort of they're there and they just sort of stick around. But the truth is that our physiology is highly malleable and highly dynamic and is constantly being shaped by our behaviors.

And, I'll give you a couple examples of this. and this is where, a background in exercise science comes in, I think, especially handy and understanding this layer of physiology.

So, I see things a lot in terms of, in terms of exercise. You know, that's sort of my reference point for understanding human physiology is how does the body respond to exercise.

So I'll give you a couple examples. If I lift heavy objects frequently, I am going to stimulate an adaptation in my body where my muscles will grow stronger and larger.

In response to that. this is not because my body likes looking big and strong. It's because my body cares about surviving its environment. And, if I send it, the signals that my environment requires me to move lots of heavy objects frequently, it will try to better survive that environment by growing stronger, bigger muscles.

if I run or cycle long distances, I will have many different layers of adaptations that occur in my heart, in my respiratory system, in my vascular system, I will grow new blood vessels to deliver blood more effectively to my muscles.

My heart itself will grow a larger chamber and grow a thicker muscle around the left ventricle to pump more blood with each stroke. I will have adaptations in my at the level of my muscles as well, where muscles, what are called intermediate fibers, will adapt and shift to become more like slow twitch muscle fibers.

and there will be a whole sequence of adaptations. Now, and I could go on. There's many different layers to that story, but, if, on the other hand, let's say I break a bone and, I immobilize my arm or my leg eight weeks later when I go to the doctor and they soft cast, I look down at my arm or my leg and it's half the size of the other one, and that's muscle atrophy from disuse.

That's the opposite thing happening. In a way. It's kind of the same thing actually, because it's it's basically just the body trying to tune itself to the demands of its environment.

And in this case, if you don't use it, it atrophies. The body basically says, I guess we don't need that all that leg muscle to survive this environment anymore.

So let's get rid of it. It's just an energetic liability. the same process is true at the cellular level and at the mitochondrial level. And what I mean by that is, if you imagine how much muscle can be lost from eight weeks of not using it, what happens with several years or decades of not stimulating and challenging your mitochondria?

The same exact thing happens. They shrink, they shrivel, and they they die off. You get less of them. and we know from several lines of research that the average 70 year old has lost 75% of their mitochondrial capacity.

And this is a loss of this is a shrinkage, up to about 50% of the size of the mitochondria compared to youthful mitochondria. And a loss of 50% of mitochondria.

So if you had 2000 per cell when you were younger, on average, now you've got 1000 per cell and those thousand are half the size of compared to when you were young.

Now you might be thinking, this really sucks that aging does this to us. and in fact, it's not aging. This is not a natural, normal product of aging. And we know that because when we look at 70 year olds who are lifelong exercisers, they have the same mitochondrial capacity as young adults do.

They do not lose 75% of their mitochondrial capacity. And and just to maybe reframe that 75% number, it's like going from a Ferrari V8 engine in your cells when you're young to like a moped engine in your cells when you're older.

Okay. So there's again, these there's these two key principles that have to be understood when it comes to energy. One is how much stress load is on the mitochondria such that is is it's triggering them to be in defense mode instead of energy mode instead of peace time metabolism.

like in other words, how much are you triggering the cell danger response? And the other aspect is how much shrinkage of your cellular engine have you incurred over the years?

And how do we rebuild your cellular engine? So those are the two big pieces of of the energy story. You just actually said my my follow up question that I was waiting.

So let's say someone has lost mitochondrial function. Can they rebuild that. Yeah. So two two things here. mitochondrial function and mitochondrial structure.

Okay. Right. Okay. All of those processes that I, that I just mentioned. So whether we're talking about, the physical structure of the heart or the physical structure of the muscles or even the bones, the bones also the same principle applies.

The bones grow denser, undergo gravity and under weight bearing and under mechanical stress and loading. And, it's been shown, conversely, even a week of bedrest, being in a hospital, laying in a bed for a week will cause a

noticeable reduction in bone density.

Literally, in seven days. So again, that same process is happening at the mitochondrial level. It's not purely a functional thing. And this is, part of the mistake.

I see a lot of people in functional medicine making. They speak about mitochondrial dysfunction. It's kind of an invoke thing now for people to talk about mitochondria.

But people talk about it's sort of purely as a functional problem. it's like, okay, well, we did the XYZ test or organic acids test for some other test, you have mitochondrial dysfunction.

Let's take some B vitamins and some CoQ10 and some alpha lipoic acid and PCU and etc., etc. and that'll turn your mitochondria back on. But it's not purely a functional issue.

It's a structural issue. So, looking at it through a biochemical paradigm is wrong. You have to also see it as a structural issue. It's like if I have a bicycle tire and my bicycle tire is shaped like a triangle, it's not going to work very well.

It's got to be shaped like a circle. Structure dictates function. And when it comes to mitochondria, structure dictates function in the sense that the physical size and number of mitochondria that you have, which again is a this is an anatomical thing.

This is physical structure. It's not function like it is going to determine function is going to determine the robustness of that bio energetic machinery.

What's called what's called your your bio energetic reserve capacity, which is like essentially how much horsepower is your engine. You can think of it like that.

And that is critical in in two aspects of things. It actually ties into the cell danger response because the weaker your bio energetic reserve capacity is, the more easily that system will be tripped into the cell danger response, meaning the less stress buffering capacity it has to handle stress load on that system, and the more easy that that system is overwhelmed.

And now it's triggered into the cell dangerous thoughts. and the other aspect is just what's your total energy production capacity? Do you have a capacity to produce and sustain large amounts of energy in your physical body and in your brain?

so how do we so my my point of all this, when we talk about bones, muscles, the heart, all of these systems are highly malleable in both directions. When we do the right behaviors that stimulate and challenge them, they will adapt and grow more robust to increase their capacities.

And if we don't regularly challenge them, they atrophy. They shrink, their their capacity goes down. Fortunately, that system is highly malleable. Fortunately and unfortunately, right.

Like in a in a way it would be great. Maybe it would be great if we all just maintain youthful capacity in all of these systems and our muscles and our heart, our respiratory system, our brain, all these different parts of our body, without having to do anything.

But that's not the system we have. We have a system that grows and shrinks according to, the demands on those systems. So the bad news is, if you if you've gone years or decades without putting much demand on those systems, they have atrophy.

The good news is you have the opportunity to rebuild them. How do you do that? Well, the the mitochondria are bio energetic machinery. If you think of let's go back to the muscle building analogy or example that I gave before, because this is this is easy to for us to understand because we can visually see it.

It's logical. We all understand it. I challenge my muscles, I lift heavy objects, my body goes, I better get better at lifting heavy objects to survive this environment.

So I'm going to grow stronger muscles. What makes us grow bigger and stronger? Mitochondria. An energetic demand on those systems. We have to challenge them and tax them.

We have to tax them to the point where they produce lots of free radicals, which we're all taught our bad guys that we're supposed to be neutralizing with antioxidants.

but we now know through a variety of studies, those free radicals actually serve very important, beneficial roles, in human physiology. And one of those beneficial roles that's really important is actually they are the key signaling molecule that tells mitochondria there is a need to grow bigger, stronger mitochondria and to stimulate a process called, mitochondrial biogenesis, the the creation of new mitochondria from scratch.

And they're also a signaling molecule for, something called the Nrf2 pathway that is involved in our internal antioxidant response system. So we have an internal antioxidant system with compounds like, superoxide dismutase and catalase, including my own.

And that internal system to neutralize free radicals or oxidants or reactive oxygen species is made stronger, like a muscle is made stronger through challenge, in this case through oxidative challenge.

So the key things that. So just to recap that we increase our endogenous antioxidant system and we grow our mitochondria and we stimulate the building of new mitochondria from scratch.

Mitochondrial biogenesis. All of those processes are stimulated by oxidative and energetic challenges to those systems.

Working Carefully with Chronic Illness and Sensitivity

And the way that we do that is through hermetic stressors like exercise, like sauna exposure, like cold exposure, like breath holding practices, like phytochemicals, and, and several other practices that tax those systems.

and by taxing those systems and then giving a break and giving rest and giving sleep and good nutrition, those systems will adapt and grow stronger to that demand.

That's great. Yes. And so there's hope. You're telling us there's hope. Definitely. That's good to hear. And what about if someone is in the cell danger response.

Can you still put that hormone stress on. Or do you have to be more careful in that case? Yeah. Great question. So let me frame the answer this way. Let's say somebody has weak muscles or low bone density.

Should they engage in bed rest and sort of endlessly until they've recovered? Or is there a potential downside to that right. Down to them. Yeah. So like you can engage in bed rest to avoid challenging a weak system.

And it might intuitively feel right to do that because when you challenge your weak system, you might feel pain, you might feel discomfort, you might have side effects, you might feel depending on, you know, what the specifics are.

You might maybe you feel wiped out or or have pain or inflammation or something like that for the day after if you challenge it. in the case of, let's say, people with chronic fatigue syndrome, or people in general who are very ill, if you go tell them to do a hard workout, they're not going to feel good during or after that process.

You know, during they're going to be suffering and probably for a day or two after they're going to be suffering. However, if you tell them to rest and avoid challenging those systems, challenging themselves, and they do that for a long period of time, what will happen is they will grow even weaker and less tolerant and less resilient in the face of future challenges.

So the real answer is always that you must engage in some degree of challenging your systems. Otherwise your systems will rapidly degenerate and atrophy.

And that is one of the leading things that will bring you to your demise faster. Fastest. is is not challenging the systems of your of your physical body, muscular system, bone system, cardiovascular system, respiratory system, neurological system.

We have a whole body of evidence on something called cognitive reserve capacity. And it's the same principle that I've been describing. You know, when I've talked about adaptations at the level of muscles or the heart or mitochondria, we know that people who, who go who have higher education and who have more complex jobs, have more robust neural networks in their brain and that it's strongly protective of dementia and Alzheimer's.

And conversely, we know that not engaging in cognitively demanding tasks will rapidly degenerate your brain. And it's it's the same, the same principle across many different systems of our body.

So we have to, if people are in the Cell Danger Response, if they're chronically ill, if they're chronically fatigued. Basically this we need to think of this as a, a shrinkage of, of what's called this is, not a paradigm that's well known outside of general science.

aging science. but it's called the homo dynamic space, and it's essentially a collection of different reserve capacities. so what I described with mitochondria being big and strong, having a big engine or small engine, that's your bio energetic reserve capacity.

Do you have a big strong heart and vascular system. That's your cardiovascular reserve capacity. Do you have lots of robust neural networks in your brain, cognitive reserve capacity and so on.

Muscular reserve capacity, bone reserve capacity, the Homo dynamic space is like a collection of all these different capacities in our system. And it's a measure of essentially what is how robust is the structure and the function of our body.

And when somebody is chronically ill and they're stuck in symptoms, in fatigue, we can think of that as a shrinkage of the Homo dynamic space, which is also their stress buffering capacity.

Where to Learn More

So the counterintuitive and sort of paradoxical thing here is these people both simultaneously have, a very, very low tolerance for additional demand on that system.

And one of the essential things to healing and getting healthy again is putting demands on that system. Right. So how do you sit with that seeming paradox? Right.

The answer is baby steps, small doses and baby steps. So you find whatever is the dose that's right for your current capacity of challenging your system just a little bit, giving your body lots of recovery time and being very slow and gentle about the process.

Slow, gentle, systematic, so that you don't overdo it and trigger symptoms. You start, you on the side of caution on the side of under doing it and under dosing. The challenge.

And then you slowly build over days and weeks into, okay, now I'm challenging my body a little bit. I'm feeling a little bit of discomfort. I'm going to just do two minutes in the hot sauna, or I'm going to just do three minutes of this breathing practice, right?

Or I'm going to just do two minutes on the stationary bike. Right. And we can start with that kind of very gentle challenge to the system. And over time, we can build that up very gradually and very slowly and systematically, with ample time for recovery and adaptation in between challenges.

Yeah. Thank you so much. That's really helpful. And, you know, really with the people that have marked so, you know, with the the population of our listeners, we have to do that a lot.

Even, you know, about supplements, we microdose, you know, so hearing that this is the approach we need to take with our mitochondria, and especially for people who are ultra sensitive everything.

Thank you so much for sharing that and you've provided such wonderful information. Can you share with everyone where they can find more about you? Sure, you can go to the Energyblueprint.com.

Yes. Well, thank you so much for being with us today. Thanks, Meg, I appreciate it. Thanks for having me on. Thanks.