Introduction and Ari Whittenu2019s Background

Welcome back. We're continuing our conversation on reversing chronic gut conditions. I'm your host, Sinclair Kennally. And today I am joined by my wonderful friend and colleague, Ari Whitten.

And Ari is the founder of The Energy Blueprint, and he's also the bestselling author of The Ultimate Guide to Red Light Therapy and E for Energy How to Beat Fatigue and Supercharge Your Mitochondria for All Day Energy.

You can see why I wanted him on this interview for you. He has a bachelor's in science and kinesiology certifications from the National Academy of Sports Medicine as a corrective exercise specialist and performance enhancement specialist.

It has completed extensive graduate training in clinical psychology, and he also holds a master's of science degree in human nutrition and functional medicine.

Ari, I think, is best described as a tireless researcher who is obsessively devoted the last 27 years of his life to the pursuit of being on the cutting edge of science and health and human energy optimization.

So welcome, Ari, and so glad to have you here. So we could do a deep dove into this topic. Thank you so much for having me. It's an absolute pleasure.

So let's just dove right in, because you and I have really strong opinions about how important mitochondrial function is to total body healing. And I really want to zoom in today for folks who have been suffering with chronic conditions for quite some time.

What are mitochondria and kids that don't remember ninth grade science? And what is that mitochondrial gut access? How could you explain that to them?

Well, what we were all taught in high school and college and graduate school and even even in medical school physiology and biology courses was basically just that mitochondria were one of many organelles in our cells and that they were the powerhouse of the cell.

So, you know, we all that's the thing everybody remembers.

What Mitochondria Do and Why They Matter

And for most people, it's really all they know about mitochondria. And it's sort of like this thing, it's okay, mitochondria have powerhouse of the cell.

So when I'm asked on the multiple choice exam, which of these organelles is is the responsible for producing energy producing ATP in the cell and is often termed the powerhouse of the cell.

Okay I checked see for mitochondria you know they're really they've really mostly been taught about for many, many decades even at high levels of graduate school education as sort of these mindless cellular energy generators that really all they do is take in food, energy, carbs and fats mainly, and produce energy for the cell in the form of ATP called adenosine triphosphate.

And even if you go deep in biochemistry and high levels of biochemistry and you learn about the different the electron train, the electron transport chain and all the different complexes of that chain and age and and goes into energy and plus and carries electrons through the circuit and cytochrome c does this and ubiquitin all does this and transforms into ubiquitin and you know, all the different parts and ATP synthase pumps out the ATP and you know,

da da da da da.

For the most part, even people who have that kind of sophisticated, very detailed knowledge of biochemistry, we really still think of mitochondria as this sort of mindless energy generator of the cell.

But what's going on underneath the scenes among mitochondrial researchers really in the last 20 years, in the last ten especially, is that really turned everything we thought we knew about mitochondria on its head and reposition them from this sort of just one of many organelles.

The thing that produces energy to something that is very, very central to how the entire body functions. One of the most prominent researchers in the space, Dr.

Robert Navio, who's an MD PhD, is a physician scientist who runs a lab for mitochondrial medicine at the University of California, San Diego. I think one of the most brilliant researchers in the whole field, he says.

Mitochondria are the central hub of the wheel of metabolism. Now, metabolism for most people means something, you know, associated with how much, how fast you burn calories and weight loss and that sort of thing.

But the real meaning of metabolism is the summation. All of the the totality of all of the different biochemical reactions occur that occur everywhere in your entire body.

So what he's saying is mitochondria are the central hub of everything that happens in your body. And we you know, in the last 20 years, we found out that mitochondrial dysfunction is linked with neurological diseases, is linked with cancer, is linked with heart disease, is linked with pretty much every disease you can think of.

If you go on Google scholar PubMed right now and type in mitochondrial dysfunction and any disease you can think up, there's probably a whole bunch of research on it linking mitochondrial dysfunction with that disease and that picture.

The fact that you can do that is really painting a picture. That mitochondrial function is central to everything that happens in the body. As as Dr. Navio says, it's the central hub of the wheel of metabolism.

And we're finding out every day that mitochondria are far more than just these mindless cellular energy generators. They're involved in our immune system.

They're involved in how our body controls and responds to inflammation and oxidative stress. It's involved with producing the energy that powers virtually all of the trillions of ourselves.

So if it's not producing enough energy, those cells, whether they're gut cells or brain cells or heart cells or muscle cells, they don't do their job as well.

And when they don't do their job as well, they start to dysfunction, they start to fail, and ultimately you start to get symptoms. Most importantly, what we've really learned is that mitochondria have a second role beyond their role in energy generation.

And that's what I mean by they're not just these mindless energy generators. Their second role is really as environmental sensors. And their job as environmental sensors is to pick up on whatever whatever dangers or threats or stressors you can you could say are present in the environment that is to say, in the body.

And to the extent that there are dangers or threats present, the mitochondria are designed to as their role as the central hub of the wheel of metabolism.

They're coordinating the response of how the body is going to respond to that threat. And the main thing that they do is turn down the dial on energy production.

So in other words, to the extent that your body is under attack, is under threat, and it can sense virtually every threat imaginable, from psychological stress to exposure to toxins, to sleep deprivation to poor diet, to leaky gut and and infections and any other stress you can imagine, mitochondria can sense it.

And to the extent they're picking up on those threat signals, they're turning down the dial on energy production and shifting resources towards cellular defense.

And to the extent they're doing that yourselves, their job as energy generators is being done less well. So another way of saying that is mitochondria have two roles as energy generators and as environmental sensors, danger sensors.

Signs of Low Mitochondrial Function

And to the extent that they're doing one, they are not doing the other. In other words, these two functions are mutually exclusive. So to the extent your mitochondria are picking up that there's a lot of stressors or threats present, they're turning down energy production.

And to the extent they're doing that, the cells of your body that rely on energy from your mitochondria, again, whether it's your brain cells, your muscle cells, your bone cells, your skin cells, your liver cells, your heart cells, your gut intestinal cells, they all pay a price for that because they don't function and do their job as well.

So too and I should also mention one last thing, which is the risk of being too wordy in my answer. But I just want to say because it's important, mitochondria have even been linked with the rate of aging at the cellular level itself.

So mitochondria are really central to the health of your mitochondria are central to the health of everything in our body. This is such an important overview, I think for people who are struggling with chronic conditions because we can get very myopic, especially the longer we have a condition, the more down the rabbit hole we go in terms of like looking at different pathways and, you know, the the probiotic strain that's going to fix it all and throwing all of our energy very much downstream when it comes to the condition that's been developed.

And we're doing it all against this backdrop, really, my my clients and students say fatigue doesn't even begin to cover it. It's such a deep energy trough that the thought of asking your body to heal when you have that little energy is laughable.

Right? And yet it's becoming your full time job, the sicker and sicker you get. So I really appreciate getting to lay out this landscape and highlight this in this segment for everybody, because I remember what this felt like.

You know, basically, if I could have drawn a picture, I think all of my mitochondria would have been so danger, response, signaling mode. And it's like, we need some help over here and no help is coming.

So what would be some signs and symptoms that your mitochondrial function is low? I may sound obvious, but I really want to cover these bases for everybody so they know if this applies to them.

Myths About Mitochondrial Support

Yeah, well, good news is it's pretty easy to know. And if you're if you're fatigued, if you have low energy levels, if you tend to crash easily, if you have brain fog, if you have very low mental endurance, meaning any sort of mentally demanding task causes you to be drained and for your energy to crash very rapidly or for you to have brain fog after it.

All of those are very clear signs that your mitochondria are suffering. The other one that I would say that that is a big one is lack of resilience. So be very fragile.

In other words, being very easily overwhelmed by any exposure to stress, whether it's physical or psychological or any other type of stress, exposure to toxins, infections, anything along those lines, even something like exercise.

If you've lost your resilience in the face of doing anything that's demanding or stressful on the body and it wipes you out or you have a very hard time bouncing back from it, any of those types of symptoms are essentially diagnostic that you have a problem at the mitochondrial level.

Yeah, that's beautifully said. And of course everybody's going to want to know. Don't worry, guys. We're going to cover our favorite solutions for dealing with mitochondrial dysfunction and for supporting mitochondrial function before the end.

But first, we have to do a little bit of myth busting here, excuse me, because I think there's some platitudes that exist out there right now that are actually leading people astray.

And I want to give you a chance to comment on those. So, you know, we're not looking for I call it synthetic energy or stimulant energy. We're actually looking to reclaim and reestablish that deep energy cycle.

And so what do you think are the biggest myths out there that persist right now about mitochondrial function. About mitochondrial function specifically?

Well, you know, I have some criticisms. I want to speak to what you just said a minute ago about stimulants, though it's not specific. It's more related to energy rather than mitochondrial function.

Specifically, I would say if so, we'll come back to that in a second. So I would say if you want me to speak to myths about mitochondria in particular, I'm curious what comes to your mind.

But I would say I have some criticism of like the general functional medicine type thinking about mitochondria and how most most practitioners approach it off the top of my head.

What myths, what comes to your mind? Sinclair Yeah, that, that was actually specifically what I was thinking about as well. I think my functional medicine has done a really great job of bridging that gap for folks, but I also see that people with chronic conditions, specifically chronic illnesses that are nuanced, do not get the help they need because they are overloaded with protocols that don't actually meet a body that's on the back foot in terms of energy production.

So the biggest thing that they see out there is just that you can skip the step clinically, you know, and that you're somehow not responsible for meeting somebody needs and starting to support mitochondrial function once more and that you can get it all done with a green pharmacy or an I. V.

and that's really not the case. So we're going to have fun highlighting some of your favorite tools to help today, you know? Yeah. So so my my biggest criticism that I was alluding to very much along the lines of what you're just saying is, you know, mitochondrial function, I'll put it this way, I've been talking about mitochondria central to human health for over ten years.

When I first started talking about it, nobody in the functional medicine community was focused on mitochondria and now it's become popular and trendy.

And so everybody's talking about mitochondrial function now and all the practitioners know about it and everybody says, Oh, mitochondria dysfunction, mitochondrial dysfunction.

They use that phrase, they'll throw some tests at you, maybe an organic acids test or mitosis swab test or something like that. And they say, Oh, this test indicates that you have mitochondrial dysfunction.

Here's my mitochondrial dysfunction protocol. And it it is basically like B vitamins, alpha lipoic acid and D ribose CoQ10 and acetyl l-carnitine typically.

And it's not that those things are bad and sometimes they can be helpful and sometimes somebody does have a genuine deficiency in those things and there's research to support that in older individuals, especially.

Particularly if you've been eating a poor diet for decades, some of those nutrients can can be very beneficial. However, equating sort of thinking of the mitochondria as importance in the human body as sort of just like, you know, understanding mitochondrial dysfunction as as just something to be solved by taking some B vitamins and some other mitochondria supplements doesn't really get it.

And there's a big reason why that is the case. Really huge reason that I find almost no functional medicine practitioners actually understand. And that is, number one, mitochondria are not just dis functioning due to a deficiency in vitamins and mitochondrial supplements, they're dis functioning.

And it's actually a misnomer in many cases to claim it's dysfunction. That's the it's an improper phrase to call it mitochondrial dysfunction. They're doing the correct function in the response in in response to a a poor lifestyle, poor diet and poor lifestyle.

So that the way that a person lives is creating danger signals that is causing the mitochondria to shut down or turn down the dial on energy production and shift resources towards cellular defense.

That's not mitochondrial dysfunction. That's proper mitochondrial function in the context of an adverse lifestyle. Number one, even more importantly than that is there's research showing that with each decade of life, people lose on average about 10% of their mitochondrial function.

Now, maybe that doesn't seem like a lot, but let me tell you something that that does seem like a lot. The research shows that the average seven year old has lost 75% of their mitochondrial capacity.

And specifically what they do is they take biopsies with a big, hollow needle and they jab it into your muscles and they take chunks of muscle tissue and look at it under a microscope and count how many mitochondria are there.

And they test the capacity of those mitochondria. And what they found is that people lose 50% of the mitochondria, the number of mitochondria from the time they go to 20 years old, 2 to 7 years old, they have half as many mitochondria and each one of those mitochondria that are present have only half as much of the capacity to produce energy.

So if you do the math on that, that's a 75% loss of mitochondrial capacity. And to put this in other terms, this is basically like going from a V-8 Ferrari engine when you're 20 years old to a moped engine in your cells when you're 70.

So people. Are feeling deeply sane right now and say, let's. So, so and this is the part that's missed by most functional medicine practitioners. You cannot just take vitamins and minerals and coke you ten and a zero l-carnitine and and turn a moped engine and back into a Ferrari engine into a V8 engine.

Okay. Well all you're doing is just you. You can correct nutrient deficiencies and you can alter the signaling of that moped engine, but you've still got a moped engine and so you're still massively limited by the capacity of that moped engine.

Maybe you can improve its output by ten horsepower or 20 horsepower, but the real goal is to go back to the V-8 engine that's producing several hundred more horsepower.

And and the reason all of that sounds like bad news, the very good news is that everything I just described about the loss of mitochondrial capacity is actually not a normal natural product of the aging process itself.

It's actually the product of modern lifestyles. And we know that because when we look at 70 year olds who have healthy lifestyles, in particular those who subject themselves to higher medic stressors like exercise and sauna, they have the same mitochondrial capacity as young adults do.

They do not lose 75% of their mitochondrial capacity. So that loss going to a moped engine is actually the function of lack of gear, medic stress, lack of beneficial metabolic stress on the body that challenges your mitochondria and

keeps them strong.

It's lack of that in the lifestyle that causes the engine to atrophy, and you can't you can't fix that and rebuild the big engine just by taking supplements or taking drugs.

It has to be done through the application of automatic stress. And that that's the big part that most people are missing. So there's two pieces.

Gut Health and the Mitochondria Connection

One is we can alter signaling in the body, we can take supplements, we can take herbs, vitamins, minerals, we can even take hormones, we can alter the biochemical signaling in the body.

But the other layer that most people don't address, and that in my view, is actually way more important, is that you have to rebuild the physical, structural physiology of your body literally.

And I'll put this in other terms for you. When we look in the lab, for example, in ego, San Millan, an exercise physiologist, does research on endurance athletes, and he does research on people with metabolic syndrome type two diabetics with insulin resistance who are overweight.

Endurance athletes have 400% more mitochondria in their cells than overweight diabetics, with and people with metabolic syndrome. It isn't just a matter of differences in signaling, it's a matter that what's going on as far as the structural components literally the physical stuff that's inside of your cells in the trillions of cells in your body is 400% different, particularly in terms of your mitochondria, which are the central hub of the wheel of metabolism, central to good health and disease prevention and longevity and energy production and resilience.

They have 400% more of them. So that is is absolutely essential. And it's what most people are missing. Thank you so much for highlighting that, because I think that we we have really skipped over this piece in our addiction to the green pharmacy and just trying to plug holes in, you know, when we look at like $5,000 worth of labs in functional medicine and like, oh, you're low in these 37 markers, here's 37 supplements, you know, as long as a few of them are designed to, you know, give you an experience of boosted energy, I think you highlighted that perfectly.

The the issue with that you can't push biochem mystery and expect that you're actually changing the experience of your mitochondrial function. That's not there's only so much you can do with a moped engine.

You can alter the signaling, but you still got a moped engine. And unfortunately, too, to the point you were just making allopathic medicine. Conventional medicine has been so successful in convincing people that they can just live a crappy lifestyle and that, you know, once they get a disease, they'll be a drug cure waiting for them.

There'll be a magic pill waiting at the end of the tunnel when they get old and they get some disease. And that most people have been indoctrinated into that especially Americans have been indoctrinated into that.

The U. S. and New Zealand are the only two countries in the world that allow direct pharmaceutical company to consumer advertising. The only two countries in the world and Americans are the worst.

I say that as an American. So we've been indoctrinated with that kind of thinking, this magic pill mentality, since since we're very young and unfortunately, since most of the population has been brainwashed into thinking that the allopathic models are the scientific models, a lot of what functional medicine has done is to gravitate almost towards that same style of thinking, that same kind of paradigm that runs a bunch of, you know, fancy looking tests and then prescribes pills to people and and gets people in the same paradigm that thinks that the answer to their their problems is just to take a pill.

The difference is just whether it's a drug made by a pharmaceutical company or it's a natural compound. But the thinking, the paradigm is still a problem and it still misses.

You know, the big blindspot is what I just described, that we need to actually live the kind of lifestyle that makes our physiology work and that can't be done with pills.

Exactly. Yeah. I describe allopathic medicine, at least in the context of chronic conditions as suppressive medicine and functional medicine as a substitute of medicine.

Nice idea, but it's still not. I would describe what you and I do as generative medicine with the body's own strategies to reclaim vitality instead of trying to outsmart it or overwrite it with.

Because that is so arrogant and we're just like beside the point, you know. Agreed. So one of the things that I really want to highlight, add to that I think is important that you shared is that the mitochondria mitochondria are having a logical response to your lifestyle and prior life events that this is not like, oops, they forgot how to make energy.

You know, they have, they have lowered in function in terms of like the power plant set of tools. Right. But what we have done is and done this disservice is perpetuate this lie that our lifestyle is working.

And it's not like I had a gentleman, our newest client, you know, just came to his first session yesterday and we were doing his health history intake.

And he's down to three foods, which is really normal for people to come to us because with other people or worse, chronic conditions. And so he's down to chicken, pork and carrots, blend it and he's actually is an athlete.

And so you never know how much he's suffering. And he's had colitis since he was 15. And, you know, all the things he was put on immune suppressive drugs early.

So of course he's got like an epic case of parasites and she said, Yeah, I don't know why. I was totally fine until I was 15. And then come to find out, he was put on antibiotics over and over and over again in the first ten years of his life.

And you played in a water damage basement that flooded every year. So, okay, there's there's assured mold exposure. And he grew up on and he snacks goldfish you know top ramen.

Like what every kid in his generation grew up on. Yeah. So it's the perfect backdrop for chronic illness. So we earn this with our lifestyle and, you know, our public medicine goes, Oh, well, maybe I could cut something out for you or I can hand you a pill. But those are the two options.

Yeah, all those all those people talking about diet and lifestyle are a bunch of quacks. We're the ones who really are in possession of the science here.

Some drugs to suppress your symptoms. Yes. And also next step, if those don't work as well, just cut out a part of your colon, right? That's yeah. Yeah.

It's it's frustrating. And this is why I think your work is so important, because it makes accessible, you know, this emerging field of knowledge for people that they have way more control over their lives and their health outcomes than we even thought possible five years ago, even against this backdrop of complexity where, you know, we have, you know, we're we're looking at blue light, you know, late into the night and we're surrounded by, you know, pollutants and garbage and things.

It's still entirely possible to be vital. Yeah, 100%. So what are some of your favorite strategies for supporting mitochondria and actually regaining that function in any stage of life?

Or do you feel that they're different in different stages of life? Well, there are some differences. Maybe we'll speak to the gut component a little bit, since is this is the chronic gut condition summit.

So I'll maybe describe some of the connections briefly between the gut and the mitochondria that what's called the

gut mitochondria access. So, you know, since most people listening to this are dealing with some kind of gut condition or gut symptoms, it's important to kind of understand how that connects to all of what I just described as far as mitochondria being central to health, longevity, resilience, energy production and how they have these dual roles as energy generators and danger sensors.

So we can think of the gut as having essentially two things in relationship, two factors or two ways of relating to mitochondria. One is to nourish them by providing various substances that help mitochondria function better.

And I'll describe what some of those are. And the other one is, is to protect them from harm. And so if the gut is not doing a good job in what the gut should be doing, then you have a problem of it basically not doing its job of correcting of protecting mitochondria from harm.

So specifically, here's, here's what that looks like. So in people with chronic fatigue, for example, it's been shown that they have higher levels of pathogenic species in their gut and lower levels of beneficial species like lactobacilli and bifidobacteria.

It's also been shown that they have on average, higher levels of endotoxin, and many studies have shown prevalence of high levels of antibodies against endotoxin or LPs lipopolysaccharide which is indicative of gut permeability, indicative of leaky gut, and they have on average lower production of short chain fatty acids like, like Butyrate in particular, and what are called euro elephants and lactic acid.

And I'll describe what some of those are and how they work, what this what this picture. And actually, I'll mention that this link between those three things is so strong that there is even research showing that a computer algorithm can predict with 90% accuracy whether someone has chronic fatigue syndrome based exclusively on their microbiome composition and the presence of inflammatory molecules in their blood with 90% accuracy.

Just knowing those two pieces of data, what's the balance of good and bad bacteria based on microbiome testing? And what is the inflammatory cytokine profile look like in the blood?

Just those two things alone can predict with 90% accuracy does this person have chronic fatigue syndrome? So that's how strongly the the microbiome and gut function is tied to mitochondria.

So one of the things that we see when there's poor diversity in the microbiome, in low band, low beneficial species is higher levels of pathogenic species.

As you get higher levels of endotoxin containing bacteria and those endotoxin containing bacteria themselves promote gut permeability, which then leads to more absorption of many different compounds that shouldn't be getting absorbed into the blood.

But the endotoxin itself is both promoting gut permeability and getting absorbed into the bloodstream, where it is directly toxic to cells and directly toxic to mitochondria.

And it's been linked with numerous diseases, from neurological diseases to cancer to heart disease to many, many other diseases. It's also been shown to be directly toxic to mitochondria, so that endotoxin from the gut bacteria itself is itself a danger signal to mitochondria.

So I described earlier how mitochondria are responding to danger signals by turning down energy production and shifting resources towards cellular defense.

Well, if you've got a chronic gut issue where you've got increased gut permeability and you have an imbalanced gut microbiome or low microbial diversity in the gut that is going to lead in general to increase gut permeability, increased endotoxin floating around in your bloodstream where it shouldn't be chronically signaling to mitochondria where the mitochondria are going, Hey, we're under attack.

We got to turn down the dial on energy production, shift resources towards cellular defense. So that's that's one big

aspect of it. And the other aspect is low production of short chain fatty acids, particularly Butyrate and, and you're olefins.

So Butyrate is a short chain fatty acid that's produced largely in response to the digestion of starches, which we get from plant foods. And, and we don't get it from all plant foods.

But if you have a diversity of a lot of different types of plant foods, you're getting some resistant starch in the diet. And that is going to lead to the production of of butyrate that butyrate is an enhancer of mitochondrial function.

It's got a number of different roles. So it's it's been linked as a neuroprotection it's got a big role in actually enhancing colonic health, nourishing the colon cells, intestinal cells themselves, to keep them healthy, too.

To the extent that research has shown that when you have this functional mitochondria in those cells, just supplying butyrate alone to those cells restores normal mitochondrial function.

Where to Start Rebuilding Energy

But that butyrate also travels throughout the whole body where it nourishes even your brain cells, your muscle cells, and it enhances the ability of mitochondria to use fatty acids to produce energy, which is essential for them to work properly.

They're in the baseline state. They should be at rest, mostly using fats to produce energy and a process called beta oxidation. And the presence of butyrate having a gut that is producing adequate levels of butyrate is essential for the mitochondria to work throughout your body, for them to work properly.

The other thing that that's really important that goes on in the gut is your olefin production and actually also lactic acid production. The lactic acid was thought for a long time to be just a waste product.

You know, we talked about lactic acid production from the muscles as being just a waste product that the body has to get rid of. We now know that lactic acid actually is used as a fuel by our muscle cells, by mitochondria and slow twitch muscle.

Muscle cells and is an essential fuel. So that process of lactic acid is not sort of just this accidental process of producing this nasty waste product, but is is very important.

And certain microbes in the in the gut will do that as well. Very importantly is a substance called urolift in a and it's likely we're just sort of scratching the surface of our knowledge in this field.

There's probably lots of other things going on that are like this. But the main one we know about right now is a substance, a phytochemical called ellagic acid or larger tannins, which is found in small amounts in a number of different berries, and it's found in the highest amounts in pomegranate and in chestnuts.

And that ellagic acid gets transformed by specific species in the gut into a compound called Urolift in a and urolift in a, it turns out, is is pretty much the most potent promoter of mitophagy, which is essentially cleanup of damaged mitochondria.

If you've heard the word autophagy, that is sort of cellular recycling breakdown of damaged and dysfunctional cell parts, rebuilding of healthy cell parts.

That's this process of mitophagy is the same thing. But at the mitochondrial level specifically and you're olefin a stimulates this might injury or cleanup process.

So you can imagine if you've got a poor diet or if you've got a poor microbiome where you don't even have the presence of species that, do this process of creating your own within a or you're not eating a diet that has enough Elijah tannins for those species to to nourish those species.

So they're producing your life in a if one or both of those conditions are present, you're going to have a deficit in your in your cleanup process, which should be happening pretty much every night, your cleanup process of damaged and dysfunctional mitochondria.

And if you're accumulating lots of damaged, dysfunctional mitochondria, you are you're going to have energy problems and you're going to have, you know, again, given mitochondria that are the central hub of the wheel of metabolism, you're going to have health of various kinds, energy symptoms, meaning fatigue symptoms, brain fog.

And ultimately, it's going to it's going to contribute to the development of disease as well. So, you know, those are sort of the key connections between the gut and the mitochondria.

So interesting. Okay. So if we have already achieved imbalance for quite some time and we were doing a great job of maintaining that imbalance despite all of these other inputs that we put in throwing all the probiotics at it and oops, that doesn't work.

And what would you say when someone has been on the back foot in terms of energy production for years, even decades? Where should they start? Well, in general, people with chronic fatigue, I don't necessarily start them at the gut level unless unless there is a clear indication, meaning gut symptoms or a known history of a gut condition, that that is a good place to start.

And sometimes that is the case. I find in general circadian rhythm and basic steps in nutrition and the application of burn medic stress. If the person is healthy enough to to start doing at least a little bit baby steps in terms of who are medic stress, I find are the three most important places to start.

If there's an indication of poor diet and gut symptoms or a full blown gut condition and you've got a history there, then, you know, sometimes it's the case that a person's chronic fatigue is entirely explained by their gut problems alone, and it can be resolved entirely by correcting what's going on in the gut.

It differs here. It when we're talking about gut stuff, it differs depending on whether we're talking about somebody who's generally well and maybe has some minor or moderate gut symptoms, but can tolerate a lot of foods versus the kind of scenario that you were describing a minute ago with the guy who, you know, who who was on tons of rounds of antibiotics, who can only tolerate three foods.

You know that that's somebody who has such a severe gut disturbance. They have to work one on one with a practitioner, figure out, you know, very closely in a way that's very closely monitored what are baby steps that can be taken to help rebuild that?

But as as generalizations that sometimes don't apply to those severe cases, we can say we want to we want to provide lots of prebiotic fiber daily. And we have studies showing that, you know, the average American consumes only 16 grams of fiber daily.

We want upwards of 40, 45 in general. And and the Western diet is extremely low in in different kinds of fibers and prebiotic fibers. So we want to have a massive increase in general in the amount of different plant food fibers and diversity of those plant food fibers.

Again, you can't just jump straight into that in the severe cases like the case you were describing earlier, because obviously the person's going to have a negative reaction.

So in chronic conditions, you have to take baby steps in this direction. But as a generalization, that's what we want to move towards. We want to increase our intake of resistant starches. And there's there's examples of studies where, you know, increasing the resistant starch, whether it's just from white, something as simple as white rice or potatoes that are cooked and then cooled.

It can be further amplified by using a saturated sap like coconut oil. Even a small amount of saturated fat, like a teaspoon of coconut oil, has been shown in some studies that if you if you cook rice in a teaspoon of coconut oil

and let it cool overnight, it amplifies the resistant starch content of that rice by ten fold compared to if you don't cook it in coconut oil.

So simple strategies like that. If you eat those kind of foods regularly, you're providing that resistant starch to to the microbes in your gut that are helping to produce these short chain fatty acids and helping to produce butyrate.

The other thing that I would say is fermented foods. Again, this is something that is kind of personal.

Circadian Rhythm, Light, and Eating Windows

Not everybody's tolerant of fermented foods, but introducing things like sauerkraut, like kimchi, like yogurt and other fermented foods, probiotic fermented foods that are providing at least temporary, maybe not permanent colonizing residents of the gut, but temporary residents that have been shown in numerous studies to improve gut function.

And the last thing is a diversity of phytochemicals. So we really want to each eat a very rich diet in phytochemical content, things like flavonoids and polyphenols and anthocyanins from colorful foods, from berries, really from from colorful fruits and vegetables as well as different superfoods.

And you can also use supplements. You can supplement with powders here like pomegranate powder to help get that ellagic acid or various other kinds of powders, spirulina, chlorella, things of that nature.

So I would say those for strategies in general are where people want to move towards. And then again, in severe cases, it's, it's much more complicated because the person needs personal, personalized guidance to be able to move in that direction.

Absolutely. I totally agree with you. And I appreciate you laying out those buckets of different strategies for people to really explore. Could we wrap with just your thoughts on reclaiming healthy circadian rhythm practices because it's such an area of expertize for you and it's so accessible.

This is something people can get started right away today. Yeah, so very quickly, because I know we're short on time, I would say it's important to understand there's there's sort of two elements.

There's two dimensions. One is we've got a central clock in the brain in the super charismatic nucleus of the brain, and that is the central clock that is sort of regulating our biol biological clock as a more recent scientific discovery.

It's it's been found that we have peripheral biological clocks in essentially all of the tissues of our bodies, from our muscles to our liver to our heart, to our skin, to our lungs, our intestines.

Everything has these peripheral circadian clocks, the the primary signal, what's called in the research site GEBRE, which is a German word that is used widely, even in the English speaking literature.

It basically means external signal that influences the circadian clock and the primary site. GEBRE that influences the central clock is is light exposure.

So the most important things that you can do, they're very quickly summarized, are bright light. Early in the morning if you've got access to sunlight, that's the best.

If not, use bright light therapy, lights or what are often called sad lamps. Seasonal Affective Disorder lamps for at least 5 minutes is what you want to shoot for.

If it's bright enough, if you've got an overcast day, you might need more like ten or 15, and you want to get that ideally within the first 30 minutes or 60 minutes of waking up as much bright light exposure as you can during the day itself.

And that is actually a factor that's more important than than people realize. And we also want to limit artificial light

blue, light blue and green light, but especially blue light in the evening after sunset.

So the way that the circadian clock is designed is that blue light and green light to some extent are essentially interpreted by the central clock in the brain as it's daytime, it's the time to be awake, alert, active and energetic.

The absence of blue light is what signals nighttime. It's time for rest, relaxation and sleep. And so the many, many different hormones and neurotransmitters are tied to that central clock in the brain.

And most of our physiology is either directly or indirectly tied to that circadian clock and mean big processes, even like autophagy and mitophagy. These essential cleanup processes to keep our cells and mitochondria free of damaged and dysfunctional parts.

It's tied to these day and night rhythms. So those three elements are essential for optimizing all the neurotransmitters and biochemical processes and hormones that are linked with that.

And just to name a few hormones, cortisol is on a diurnal curve. It gets its high in the morning, it's lower in the evening. Melatonin is on the opposite curve and is coordinated with cortisol.

So melatonin is low during the daytime and rises when blue light signaling goes down. Testosterone, thyroid hormone, many other hormones, many other really important hormones are tied to the central circadian clock in the brain and tied to the rhythms of light and darkness that are entering your eyes. So people people you know, if you understand that picture that I'm painting of how many hundreds of biochemical processes and essential neurotransmitters and hormones are tied directly to this, when when this is not functioning well, when that circadian clock is not getting the proper inputs, all of those things that are tied to it, all of those neurotransmitters and hormones and biochemical processes all become dysfunctional.

So there's a quote that I really like that describes this well, if you have a symphony with no conductor, you have noise. If you have a symphony with a conductor, you have music.

Well, what we need to do is understand that our our circadian clock in the brain is the conductor. And we need to provide the proper inputs, light inputs in particular, so it can do its job, so that we can create hormonal and biochemical music instead of noise.

So that's the big thing I'll mention. Secondary to that, we want to optimize our peripheral clocks throughout our body and we that primarily through food inputs.

It's also sensitive to other things. There are some other factors that tie into this like movement, temperature in particular, but light and food are the big ones.

And as far as food inputs, we don't have enough time to go super in-depth here. But the biggest one is feeding and fasting windows. So keep your your feeding window, your eating window each day to less than 12 hours, ideally in the range of 6 to 10 hours per day.

And have a tight schedule that you adhere to every day and get at least 12 and hopefully more like 14 or 16 hours of fasting window each night. And we also want to coordinate that as much as possible.

We want to coordinate those feeding, eating and fasting windows with the light signaling. And what I mean by that is the window of time each day that you have bright light and blue light entering your eyes should be as closely as possible, tied to the window of eating that you have.

And more of those two things synchronize. The more that you synchronize your central clock in the brain with all the peripheral clocks throughout your whole body, and the more those two things sync up again, the more that you're creating hormonal and biochemical music instead of noise instead of dysfunction.

It's so beautifully said, and thank you for highlighting the eating peace with the light piece. I think this is so

important and often skipped, so thanks so much for sharing your gems with us today.

Any last words of encouragement for our audience on their health journey?

Final Encouragement and Where to Find Ari

The last thing I'll say, because I know some people hear that what I what I described earlier about going from the V8 engine in your youth to the moped engine when you get older is it can be kind of depressing to hear that and some people just kind of take a negative away from that.

What I want people to understand is that it's actually possible to rebuild the V8 engine, and that is given that mitochondria are the central hub of the wheel of metabolism, are central to disease prevention, to energy production, to resilience, to longevity.

Understand that that can be rebuilt. Maybe you won't rebuild the same engine, quite the same one that you had when you were 18, but you could probably rebuild the one that you had when you were 35.

And doing that is literally something that can add years, maybe even decades to your life. Maybe it's the difference between dying at 63 from a heart attack versus 93 from old age, and it can be rebuilt and your health destiny is in your hands.

You can control that. You can control not just the signaling of your body, but you can actually rebuild the physical structure of your body to more youthful levels.

You have that power to do that. And so I would say I just want people to feel empowered by that knowledge more than anything. So that should be the big takeaway.

It's so beautiful. Thank you so much. Where can people find your work? My website is theenergyblueprint.com. I have books on Amazon and I have lots more good stuff coming very soon.

Top secret. As of right now though. All right. Well, keep us posted.