How To Know If You Have Poor Mitochondrial Health And The Best Way To Fix It Transcript

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Introduction to Resilience and Mitochondria

The key thing that they find it. Centenarians and people that are living healthy lifespans without chronic illness is that they have resiliency. And so you could be like, you know, temperature resiliency.

They could be immune resiliency. But check resiliency, character resiliency, physical exercise resiliency and resiliency can easily translate to how effective the mitochondria is in the system.

This is doctor talks. Welcome Doctor Kharrazian, and such a pleasure to have you. Thank you so much for joining us. Thank you Air. Pleasure to be here Okay, so first of all, there's a lot of talk of mitochondria these days.

And we've had ten, 20 years now of research that has really brought to the forefront the importance of mitochondria. For a long time it was kind of just, hey, this is one of many organelles in the cell.

It's the powerhouse of the cell, quote unquote. And and, you know, takes in carbs and fats, pumps out ATP. And that's sort of all you need to know about those little mitochondria in your cells.

And now we've had a couple decades of research that have have really put mitochondria to the forefront of discussions around health and many, many different diseases.

So and there's also sort of, I would say different stories, different narratives and paradigms that have been presented around mitochondrial health. I'm curious just to start this, how do you see mitochondria in the overall picture of human health and disease and longevity?

How would you describe their role? Yeah, that's a good question.

Mitochondria, Recovery, and Fatigue

So ultimately, when you look at the studies on longevity, the key thing that they find in centenarians and people that are living healthy lifespans, but that chronic illness is that their resiliency and resiliency could be like, you know, temperature resiliency, they could be immune resiliency, particular resiliency, character resiliency, physical exercise resiliency and resiliency can easily translate to how effective the mitochondria is in the systems.

And even though the mitochondria gets, you know, focused in as the energy powerhouse of the cell and it makes energy, but is a cell signaling unit, I mean, the mitochondria does trigger the initial stress response.

The mitochondria does initiate two different proteins, normal immune activation for an infection. And it generates heme to produce hemoglobin. I mean, it's like what we need to recover.

And you know, in a clinical setting, you can even go to, let's say, not only just longevity mechanisms of aging, but a person's ability to recover is like directly related to the fitness of their mitochondrial systems.

So if you have, let's say, three different people, let's say two different people say one person had a traumatic brain injury. One person has a chronic viral infection.

Let's say both people have the same thing. So like for example, a traumatic brain injury for both. Both people. Well, the one that has greater mitochondrial efficiency is probably to recover faster.

So when it's a viral infection, the one has probably great amount of control. Integrity is going to recover faster. So

whatever this condition is and our ability to heal ourselves, homeostasis is all energy dependent.

And if you look at any, you know, so any biochemical pathway and sees all those diagrams and charts like that all runs on ATP and then the mitochondria, we have a directly impacted by the things we do in our life.

So, you know, we have to be able to make mitochondrial mitochondrial biogenesis that requires activation between the clear mitochondria. My G and, you know, things like lack of sleep or overeating or hormonal deficiencies, all these things can impact how we clear out these different hormones.

I mean, these mitochondria, protein turn structures. So it's one of those things where as a clinician, the biggest clue for us is they come in and they say they have fatigue.

Then I'm like, okay, the mitochondrial system is inefficient. And then the question is, well what kind of fatigue do you have. And then, you know, the next question is what do you do?

And ultimately when we look at the mitochondria from a clinical perspective, the mitochondria has needs. The mitochondria has to have glucose right. And or ketones one or the other.

But let's just take glucose for now. But if it has glucose, and then you know, it can it's what it needs the substrate to run processes. If someone gets fatigued after meals, we can check in later between meals.

You really know mechanism where the mitochondria can function. The mitochondria needs oxygen. So if someone has asthma and you're wheezing and they have some allergies that are respiratory, we know they're going to be inefficient.

So as Nehemia and they can't carry off to the mitochondria, we already know they're just not going to be a chance for recovery. You know in a clinical setting we have like deal breakers.

Like there's no way they're going to be able to recover because their mitochondria isn't able to produce ATP and get those things to work. We know the mitochondria are extremely sensitive to free radicals.

Oxidative stress like chemical loads. It's it created some to response depletion of antioxidants. Those things will cause the mitochondria to fail. So we're trying to do in a clinical setting is start to dissect that.

What's the cause of the how many mechanisms they have that are causing the expression of fatigue? Because fatigue is basically a chemical window of mitochondrial efficiency.

So, you know, people that have great mitochondrial function are the ones I don't pirate, the ones that recover, that can recover quickly, and workouts.

So we hear things like, I can't focus for a period of time or I can't work out like I used to, or I can recover from my workouts. Those are clue to us that the mitochondria systems are inefficient and typically it starts with loss of endurance first.

So it'll be like, I can't run like I used to. Right. And there's muscular mitochondria I can't I can't read as many chapters as I used to. I can only read like three pages in a team.

That's brain mitochondria. So whatever system we're looking at, we will see is mitochondria fails us. Fatigue is like endurance issues first and then gets into progressive fatigue.

And the way I kind of look at my patient population is when they tell me how fatigue is. One of the other things that may be, red flags of what the mitochondria needs.

Then we need to find that intermittent fatigue. Do they have fatigue all the time or is it debilitating fatigue and debilitating fatigue? We're worried about things like cancer, malignancy, autoimmunity to the mitochondria, which

we see with people that have, you know, like the so-called chronic fatigue patterns in my, you know, things like that. But that's kind of the thought process.

I just kind of rambled off. But you answered a question like, start Doug. Now that was great. And I love that you've presented resiliency at the at the at the beginning of your answer at the as a sort of foundational aspect of your answer, because this term resilience is something that is obviously incorporated in, in modern vocabulary, but it's typically framed as a, as a purely psychological concept, as something that happens in the mind.

It's like, how resilient are you? But there's a physiological basis to resilience. And as you said there, it's it's all about stress buffering capacity at the cellular level.

And stress buffering capacity is essentially the synonymous with energy production capacity. How much energy can your cells produce to meet the demands that are on them from those stresses, which relates to your ability to not only handle the stress, but also you give the example of like traumatic brain injury or viruses or things like that.

How quickly can you bounce back, which is, you know, oftentimes the difference between bouncing back or not bouncing back, being stuck in chronic illness.

If you have such a degree of overwhelm of your cellular capacity for bouncing back, actually, you know, when you look at a chronic patient, the person who's gone through the health care system and they're getting all these different diagnosis, and I can really figure out what's going on.

And one from practitioner to the next to the next. A key thing is they don't have the ability to recover whatever it is. Then the question is why do they not have the ability to recover?

Then you can go to different athletes. But one of the key things is ultimately what's causing the mitochondria to not function, to not work. And then, you know, it can be a whole list of things.

That's where it can be a little confusing, where things go wrong is are like people will hear about mitochondria functioning again. We need some CoQ10.

We had some you ten and we had like really fancy niacin and I cinema. Right.

Why Functional Medicine Often Misses the Mark

And we had nutrients like that or could not at all or something like everything is going to work and it's like no it's it clinical setting. Obviously chronic patients, they're coming in with bags full of supplements.

They're not sun a supplement deficiency issue for some people. You know, taking various nutraceuticals can maybe give them some minor function, you know, and maybe help on the recovery pathway.

But you really have to treat the underlying mechanism of what's happening. So usually when people can't recover, it's it's like this load of various things that are causing the mitochondrial to not function.

And then the basic things we already know, like we know people need to have sleep, we know people have to have movement. You know, people have to have nutrients and healthy diet.

We know people need to have relationships. All these things actually have a chance to impact mitochondrial function. Whether it's biogenesis or my top figure here for these different pathways.

Now, ultimately, like for me, I see a lot of patients that have traumatic brain injuries. I work with we're trying to help them recover. We'll see patients that have like chronic and losses in the can't recover.

And the first question is can they make mitochondria and how do you get mitochondria biogenesis. So how do you make more mitochondria is where you can change your mitochondria concentration.

In our system in our tissues and cells by things we do. Right. So if you look at the literature, what they're looking is the signaling agents for mitochondrial biogenesis.

And for the most part, there really tend to be things like antioxidants, as you know. You know, things like green tea, things like virtual. They turn on the stellar messengers that can then can theoretically produce many contra, but they don't produce mitochondria.

They just turn on the messenger pathways. And then what you actually need to have the prismatic conduit activation. So you actually have to stimulate movement.

And you have to have for me system to stress to the system to, to make those things work. So, you know, it's the analogy that, that I often uses is building muscle.

It's like you're not going to build muscle unless you've created the demand that makes your body want to adapt to that demand by building more muscle.

Exactly. And it's the same thing we we do like neurological rehabilitation. If someone had a stroke or injury, then the question is like, what can't you do?

I can't I can't walk in a straight line. Perfect. That's your rehab. Exactly. That's my nose. That's what you're going to do. The range of injured now has to reconnect.

And mitochondria is necessary. Says you keep activating those pathways, you're going to stimulate mitochondria biogenesis. So I think one of the key things that's missing in the clinical world, especially in the world of nutrition, is just focusing on like a supplement dump, like a hormone dump, like throwing toxins in, not really discussing activation and what things are.

So like, back to this scenario, if a person can't read a chapter, it can only be three pages and said, well, thing is, oh, I read, three pages, I've done this like, no, you're going to get your gain when you read three and a half pages, then maybe four pages, and you keep pushing that system and that's how you actually stimulate mitochondria biogenesis.

So mitochondria biogenesis, the key thing now interesting thing also is physical activity. Movement has been shown to build mitochondria through all different tissues in the body.

It's not just specific for the muscles. So I mean they find like liver mitochondria concentrations go up when people do physical activity in exercise.

So one of the key things is there has to be some kind of movement, has to be some type of activity colorable to what the person can handle. You know. And I remember meeting a mentor a long time ago, she goes, listen, until I get sick, you gotta get them to move or they'll never recover.

I don't care if they're throwing in a lake. You know what? I'm if we put her on a barrel and they're just paddling away or whatever they need to do. Yeah.

And I've actually used the analogy and it's a patients that have been severely ill like and like just lie in your bed and just move your arms and legs for as long as you can and then that's it.

And then recover and then try to do that sometimes at the day. And as they do that, they're building mitochondria throughout the whole system, like a sedentary lifestyle is going to completely impact the potential for mitochondria biogenesis.

But you don't have to be super athlete like, you just have to work to your level of whatever fitness you have, and then push it a little bit more. And that causes this whole misses effect and does the same thing with brain.

Like a person damage your cerebellum and they have balance issues. And we just have them work on their balance system for whatever level of time they can before they start to get dizzy and then they back off.

But if that action doesn't take place like that, stimulation to train on these protein necessary pathways or proteomic pathways to generate the activation of mitochondrial biogenesis, where you actually turn on these duction of these people cannot recover.

So this is the problem with this supplement game and so forth. Now there are some people that are so severely mitochondrial compromised where you may have to take down their inflammatory load before they can move and do things right.

There are people like, I've had patients that say, I can't. If I go outside to get the meal, I'll be in bed for the rest of the day, like, I can't do that.

And those are like the more severe cuts. So, you know, for them you might, you know, when we have to they can reduce their load with other factors first.

But then encourage them to go get them out and get some movement. And it's like there has to be some degree of or misses or suffering to these mitochondrial biogenesis pathways.

And I think that's one of the biggest things I see neglected in, you know, in the clinical setting world is emphasis on everything besides that. This is why I love you, Doctor Cassian.

And this is why I knew you needed to be a part of this, this, this, this summit. Because this is what you just talked about is something I've been talking about for years, and and I and it is my criticism, my constant criticism of the functional medicine space, because very few people have, have really understood mitochondrial biogenesis and its importance and, and the role of her nieces in that.

There's so much of I feel, you know, mitochondria have sort of come into vogue now everybody's talking about it. But for the most part the paradigm is sort of, hey, you know, you probably have mitochondrial dysfunction and we'll run these organic acid tests and maybe a might a swab test or maybe something else.

And based on that will, you know, will determine you have mitochondrial dysfunction. So here's some B vitamins, some alpha lipoic acid, some CoQ10 and some PKU.

And you know that that's the solution. That's the protocol for mitochondrial dysfunction. And it's like no, we have so many lines of evidence showing that, essentially the modern lifestyle causes a loss of about 75% of the mitochondrial capacity.

By the time a person is 70 years old, there's this massive atrophy in the same way that a muscle tissue that that a muscle atrophies if you immobilize it, put it in a cast.

It's same thing is happening internally at the mitochondrial level. We have to rebuild that cellular engine. And I'm so glad that you've emphasized the importance of this in your in your answer there.

I'm wondering if you can speak to kind of a little bit more in depth of the typical functional medicine paradigm of, of mitochondria and mitochondrial dysfunction and how most practitioners are attempting to treat it.

Well, just like you said. There. There you go. I mean, there's no right to like hundred percent organic acids test or the urinary tract. And I see these beautiful map.

The lab points out different metabolites of mitochondria. And then oh, here's this function. Like you need to think that's a ridiculous model. I don't actually remember talking to one of these labs that does think, oh, why are you selling this nonsense?

It's so ridiculous. Like, this is not how this works. You're not capturing true mitochondria with your urine output. It's happening in the cellular level.

Jumping to like a single nutrient for that is like clinically. Who wrote this clinician never wrote any of this stuff. And then, I mean, it sounds like it's very scientific and I think people are drawn with that.

And, you know, there's a point where I just almost have given up on health care practitioners to I'm an educator. Then, like, how could you not critically think like, why do you think so many of them are just protocol followers and they don't think, right.

And it's like, how do you think the metabolite in the urine? And they tell you what's happening in the cellular space, and then what should happens to practice to the patient is they get a supplement overload of stuff.

They get all this money spent in actual diagnostic testing. They may not still have any any outcomes with benefits. Or maybe you want someone actually help them, but it's totally unrelated to the lab test.

It's just something the body like responded to and then like, oh, it must be working. And I think if a practitioner gets a few of those accidentally, then, you know, they'll, they'll, see how it works.

And, and, and in particular, I'm not a big fan of the organic acids test. I think most of the metabolites, first of all, from a laboratory perspective, working in a lab as a PhD student, they're not reproducible.

Like, a lot of these markers are terrible. Like, if you if you measure the person at different times, if you even do the same biomarker the same day, they're not that effective.

So now it's like if you take someone and gave them like advice and said, I'm going to give you a dice test, and every time six comes up, I want you to use koku ten every time one shows up, wants to use a multi vitamin product or whatever, and someone comes in to go get a six and hey, you want this?

And then eventually there's going to be some people that maybe it helps, but it doesn't mean the testing was accurate. So I think this level of frustration, I also have the biggest, the biggest clinical indication that a patient's mitochondria is improving is their endurance for whatever they could do improves.

And their fatigue, or if the energy levels themselves can be changed. But the first is going to start with the dirt. So now they can do things longer at their own fatigue as much whatever it may be.

So that's the key to and resiliency. So now they can eat maybe a meal and they're not totally passing out.

Building Mitochondria Through Movement and Stress

Now they can go three hours down a meal and a bunch of it's not dropping. Now they can lose a night's sleep. And then I can take the, you know, call them the next day.

All these things are resiliency. And resilience is a big part of it is mitochondrial integrity. I'm so happy to hear you say that, because for years I've been telling people that the symptom of fatigue itself, the symptom of lack of resilience, the symptom of loss, of endurance, of stamina, are actually more sophisticated, more accurate markers of your mitochondrial function than your organic acids test.

And it's hard for people to understand because it seems much more primitive, it seems much less sciency and sophisticated and cutting edge. But you have to actually be sophisticated with scientific literacy to understand why.

That's why that's true. So I'm glad to hear you. It must be very fair. My views must be very frustrating for you interviewing all different types of people.

It is often. Yes. And I'm very happy. And to be honest, a little surprised because to to hear you say this not not

because I, you know, I know I've known you for many years now, and I know you're absolutely one of the most brilliant minds out there.

But the truth is that there are many very high intelligence people who are sort of suckered into bad modes of thinking. If you don't have the right paradigm and you don't have the like, really the orientation to think critically and think for yourself, oftentimes you end up just sort of following the experts and doing what everybody else is doing, and you let you let groupthink go on.

And there's another aspect which I'm sure you might have some comments on, which is within the culture of functional medicine. I think, and also like financial incentives and marketing of all these practitioners trying to to market themselves and promote themselves.

There is a culture of like one upsmanship where different practitioners are trying to one up each other by having a more sophisticated testing panel and, the fancier tests and a fancier sounding methodology and these kinds of things.

What what you're talking about and what I'm talking about here, saying, hey, the symptom of fatigue or, you know, which is free, you know, you have access to it.

And with a simple questionnaire, just ask yourself that question or your resiliency or your stamina. These these sorts of symptomatic markers are actually more, more accurate.

That is less sophisticated and from a marketing perspective sells less well. And so I think I think that culture promotes this kind of environment where all these practitioners are constantly seeking fancier and fancier and more and more tests of various kinds.

Yeah, that's one of the red flags for me. When I see a file come in from another practitioner, if they done a lot of testing, I'm like the new they don't have to test.

And then like the seasoned practitioners are doing a very detailed history and then they're making some like realistic goals. Read four pages and three, you know, the the mailbox can don't get dizzy.

So again on your PDA. And then those become really noticeable things to to monitor and ultimately with, with just chronic cases. It's it really is a trial and error game.

And I remember talking to a friend, my estate, I'm like, listen, I'm at the point where I don't trust what anyone else says. They don't know what their bias is in their ability to interpret the information is.

I had a hard time trusting a lot of research because we use a p value 0.05 for every study, which means the study is perfect, 120 or wrong, and no study is perfect, then it's like, okay, there's only been one on this study.

We don't have enough like to do a meta analysis. So okay, I'm looking at bits bits and pieces of information. I'm looking at labs this lab error. And then there's misguided things with with the labs can actually mean.

Then you put that all together and then you know, like okay, I'm just I have a bunch of stuff that may or may not be effective. And of course, it's useful to see a mnemonic and things like that, but I was looking into more subtle things.

Ultimately, you're stuck in a clinical setting with this patient can't do these things. What can we do to trial error and how can they potentially recover?

And if they recover, that's a clue that we're hitting the right pathway when we do something to his improvements. And if they don't recovery, then it's also diagnostic, meaning that's not what we need to go through the whole process.

So I think that's that's like where it really is and ends up anyways. And I think for a patient that can be very frustrating because they want to get answers right away.

There's something very attractive going, oh okay. Oh I have I have multiple I have more toxicity, I have Lyme disease or I have heavy metal toxicity. It's just these simple things.

And then and obviously they can spend thousands of dollars going down that rabbit hole and not really getting any outcomes. And that's what they have to be careful about.

Now, I would say when it comes to mind control, like mitochondria biogenesis, the key thing, the key thing is kind of counterbalancing we've been talking about getting hormones is getting activation, getting it pretty ohmic message to actually make these mitochondria.

And we can all make them I mean, the more movement, the more activity we have or cognitive stimulation we have, the more challenges we have to our system, the more wallet control we can make.

And then the next thing is really getting rid of unhealthy mitochondria. So this whole my topic pathway is we have like only so much space in a cell, and there's only so much mitochondria that can be generated in this cell.

And if they're unhealthy and bad then it's actually going to impair mitochondria biogenesis pathways. This and if you if you look at all the research on my top I do the clearing out of these unhealthy mitochondria.

There's a period of time they just wear out. So as they make energy and ATP these cells become less efficient. And then we have to get rid of them, and we have to get rid of them in order to have space for new ones to come in.

So if this mitochondria pass through this clearing out of unhealthy mitochondria that have kind of worn out over time isn't working. And it's a big problem.

And that goes back to just like sleep, like you kind of have sleep. I mean, I think people don't realize physiologically, the reason we have to have sleep is because we have to use all our energy to get rid of all the debris cells.

So like human activity and getting proper sleep, I mean, some of the best remedies for any kind of fatigue endurance issue then any nutraceutical. Yeah.

Have you paid attention to this, this emerging line of research, and especially with Russell Ryder, around melatonin and mitochondria, there's there's been some pretty new and I think I think will when all is said and done, ten, 20 years from now, I think we'll realize that this is a really important aspect of physiology.

But there's this as it stands now, 2023, it's very new research showing that that mitochondria produce their own melatonin. Or have you seen this research yet? Oh I haven't seen it.

Oh interesting. Okay. Have you always bring up stuff I've never heard of? Okay. You're going to love it. Well so it's it's it's super interesting and I think you're going to be fascinated by it.

So there's Russell Reiter is probably the most well known melatonin researcher. He's an old guy now, but he's been researching melatonin for I think, several decades.

And some really fascinating research showing that mitochondria. So the only it's not just the pineal gland, and it's not just the gut that's producing the supply of of melatonin, but it turns out melatonin is this critically important mitochondrial antioxidant that also interacts with the internal antioxidant defense system glutathione, superoxide dismutase, catalase.

And he oxygens in some of those other internal antioxidant defense system to recharge that that system at night while we sleep along with, you know, my autophagy and all those things that lots of other beneficial things that go

on.

But it turns out they did experiments in mice where they removed the pineal gland, and then they measured levels of melatonin in the mitochondria.

Sleep, Circadian Rhythm, and Melatonin

And they found that in mice with no pineal gland, that they still have the same levels of melatonin at the, at the mitochondrial level. And and then they discovered that mitochondria and that melatonin is so important to mitochondria that mitochondria actually produce their own supply of melatonin.

Wow. And and that interestingly, hermetic stress especially exercise stimulates an increase in not likely to help balance the redox, help balance the the oxidants that are also produced and especially red light.

So obviously we get that from the sun but also red light devices stimulate that stimulates very strongly this mitochondrial production of of melatonin.

Anyway I, I think it's going to be an important layer of physiology. And I'll share the research with you. After we get off we went from. Yeah, yeah, it makes sense.

I mean, I know for sure as we sleep, when the pineal gland itself is producing melatonin, it primes the immune system. It activates mitochondria, pathways for patient and, it and so forth.

But, yeah, that's the thing. These these are interactive, you know, different types of cells. And the key thing is going back to you have to have or misses, you have to have stress, right, to activate them.

And then you have to have sleep to get rid of them. And if you're not sleeping well. And also circadian rhythm is just like a general circadian rhythm is really critical.

So the other thing like I'll do with patients that are having issues with endurance issues, maybe when we build our mitochondria is again we get them to move with whatever limitations they have, but try to induce for misses.

So it's difficult for them. It's not like they can walk and still probably want to push it a little bit. So whether it's getting the heart rate up a little bit more, the length of time, something to really push their activity and we want to do that cognitively.

You want to do it physically. There were those challenges maybe. And then we really want to focus on making sure they get enough sleep and improving their sleep hygiene, but also then really trying to get their circadian rhythms working.

So we get them in the pattern of just trying to start waking up at the same time, eating the same time, actually the same time, and just get this as efficient as you can.

So for them to recover. And I got to tell you, working with people who have like brain injuries and brain injuries is a massive insult to mitochondria, neurons.

And that impacts to recovery. If we don't do those things, they can't recover. They have to, you know, have proper sleep, proper or missus activation and normalizing a circadian rhythm to really make that system work.

So yeah, it's like the starting place for me. And then what we like to do is kind of then go, how do they respond to their their activation and stimulation.

There's like there's some people who completely crash when they try to increase the Or. So this was my next question. I'm glad you brought it up. Okay.

So then for me, I want to go. Okay, well, what kind of how do they crash and what caused them to crash? So there's just any kind of physical exercise?

Really, I mean, for me, I start to really think about, do they have any antioxidant reserves that might be a trial that would do we might like bump up host, you know, series of antioxidants for them like green tea.

It was virtual tumeric I borrowed from, you know, whatever series of cocktails off white book acid. And I see and then see if that mode over the next few weeks can start to impact interests.

Can I interject one one thing very briefly? Part of the reason I think this melatonin story is so significant is, is because it's such a strong mitochondrial antioxidant, and because it interacts with that internal antioxidant system.

And given that light, specifically red wavelengths of light which we get from sunbathing is probably the single most potent source of mitochondrial melatonin, I actually think that what's what's going to come out of this is that we realized that sunbathing is really, really important.

Getting adequate sun on our bodies isn't as much more important than just the vitamin D story that most people think. Most people think, oh, you know, I can I can just pop a vitamin D pill, and then I can spend my whole life indoors and not getting sunlight.

And the vitamin D has me covered for the benefits of sunlight. And it's like, no, no, no. If you really understand what sunlight's doing to you, you'll understand there's a lot more layers that story than just vitamin D, and I think that we're going to figure out that this is a big one.

And I think it relates to what you're just talking about. There. I think you're right. I think that's going to be huge. I think it's it's more than just 11 D wow, that's really interesting.

But you know, it brings up the point of these antioxidants and these systems. That's another area. So that's not one of the key things that we have to make.

Mitochondria challenge in our system is to clear mitochondria. The other one is mitochondria are very susceptible to free radicals inflammatory mediators and so forth.

And so some people that are chronically ill, they just may have their pre radical, you know, pro-inflammatory load exceed their anti-inflammatory, antioxidant load.

And those cases we'll know right away. It's not as theoretical as once we put them on a series of those compounds. See they're going to make a big difference or may not doesn't.

Then we know that we have an issue for some people they may notice. Some change may or may not be 100%. They may be like 20% or 30% or something. They they definitely notice it when they miss it.

You know, when the red is one of the red flags for me is also when I see a patient come in, they have a list of was up and say take thank you. Okay. You're you're stuck in an island.

You call I take three three supplements with you. Which ones are taking? I don't want to take one until, you know, like what are the priorities? And if they're like, oh, I got to have a nice little system.

I've got to have my, you know, green tea. I have to have, you know, and it's like, these are all into ops to like, okay, you just need to boost your levels of limits and, and then we can then we're pretty much much more cautious in the recovery, you know, and then and then that's where you really like for me that's when I go, okay, I really want to take a deep dive into, things that can a couple of mitochondria, air quality in their home.

That's a huge one for me. I always like to check their air quality, make sure them air filter, you know, their home base. So then you look at chemicals. But I'm not looking at exotic chemicals.

Don't I look at chemical load in their home and then see what we can do to mitigate that. So always use air filters. We'll try to make sure that they know they're using ceramics and glass and you know it just goes through acquire and storage of foods and things like that.

So I'll go through the whole like trying to reduce the chemical load. That way we may even check chemical levels with, you know, with different profiles and see if they have any elevated levels and, and see if we need to support the process formation pathways and go through them.

Now that only happened with a small percentage of people. Like that's like most of us, not everyone. And I can tell you, if I ran a chemical load profile on a hundred people, I'm going to get 90 back there.

All right. Since those people that have a high chemical know that there have any symptoms, they have a pretty good antioxidant, you know, bio transformation pathway that even though they have this load, it's not devastating for them.

Right. So next there's the other variable, the other factor. Then I'll want to like so then I'll let go through and just start to look at what things impact through bioenergetics.

Evaluating Fatigue: Antioxidants, Toxins, and Blood Sugar

Like what things really impact their energy levels. So let's assume they're just having intermittent fatigue. So some days are better than others right.

And they can have a bad day or a good day. So that's like what I call it intermittent fatigue patient. And the intermediate equation are totally different then every day is terrible.

I can't get out of bed. I can't function, I can't. It's a whole different. What's different physiologically is okay. Well, first of all, I think a lot of those people have severe autoimmunity.

There's a whole list of theories related to mitochondrial autoimmunity, but they haven't been able to identify the target protein yet. But it's pretty clear that there are target proteins.

There are some mitochondrial proteins that have been published, like people that have, severe fatigue mechanisms. I think some of that's going on and those are really, really difficult to turn around.

It's not those are those are just how do we try to improve the quality of your life, at least in the clinical setting? The skills I have to try to help them with what I can do as a function as a practitioner.

Those are people that come and go, okay, we got this nailed, I think get you fixed that first, you know, and sometimes they do have like serious. There are some examples of people actually do get mycotoxins exposures or people that really do have toxic mold and they really get sick from them pre, you know, they're not as common as people think, but they're definitely there.

There's some kind of severe illness like a mycotoxins poisoning or something like that that sometimes comes up sometimes I had this one person who was working and they would have these busses turn on.

He's working in this with many like, executive in a hotel and every morning to have a shuttle, he would just stand in front of this gas exhaust in the shuttle and drink coffee with their coworkers.

And it's like, that's a lot of benzene exposure. You just stop for like two weeks. So I feel a lot better. And it's like, okay. Yeah, it's it's it's amazing.

Down here in Costa Rica, everybody leaves their engine running when their car, when their car is stopped and they're hanging out next to their car, they leave their engine running because because it's so hot that they want their AC in the car going all the time, but they'll sit outside, like when we need to go to the airport or something.

We have a taxi come to our house. Invariably, without exception, every one of these people will park in the driveway, get out of their car waiting for us, leaving the engine running.

And so the whole process of putting the the, the luggage in the car and getting loaded up and all that stuff for 20 minutes, you're like breathing exhaust fumes.

So I have to if I don't say anything, I will be breathing exhaust fumes. So I have to ask these people every time and they get annoyed with me, of course, to to turn the engine off.

But you know, you imagine somebody doing that job where they're for hours every day breathing those exhaust fumes and they don't think anything of it.

Exactly. So those are like the things that, you know, like you take a deep dive in and you start to think about it. And, and a lot of times, like the patient themselves, they feel like you really think it's that, like, why don't we try?

Yeah. So so we're trying to try to find a source of lubricant, especially if they have very have a lot of difficulty with activation and movement and crash really quickly.

And we definitely think of chemical related issues. Blood sugar is always a big one. There can be a lot of people have blood sugar issues that will definitely impact the mitochondrial functions.

We need to have glucose to to make ATP. So we'll look for the classical symptoms of this, like seemingly admirable trigger levels by asking, how do you feel after you eat?

And then all answers should be not hungry. And if they say I feel energized, they can focus. I can think, I can concentrate again. And that's a sign that we're hypoglycemic.

So they may be going to along with that eating and having, you know, hypoglycemic mechanisms to address. And then those like I'm really tired after eat.

Then we think the mass of insulin resistance issues. And that could be even one of the factors why they're not carrying what goes into their cells to feed their mitochondria.

So, you know, a lot of times, you know, we get a chronic exacerbation and you like get him to move, develop activation of mitochondrial biogenesis, get him to sleep properly, start to get a normal circadian rhythm, stabilize their blood sugar levels.

And we may not even use any cell phones at all. And then finally starting to recover. Now, the list of 100 supplements is like that kind of way. Now, sometimes this happens definitely do help.

Like nutraceuticals do help, but they're never going to work on their like on like there is an an interesting was going to do those mechanisms with my g and mitochondria fusion in my culture about Genesis and just like can happen.

Yeah. So those are there are the strategies that we try to do it. So it's almost really more of like a lifestyle medicine approach that there are like various factors like people do have toxic load or sometimes really bad transformation pathways are working.

But it's that's kind of the real game. The real game is not a major surgical issue. And there's people that have for example, do have hormone deficiencies or actually do have hypothyroidism.

There are people that have like underlying diseases no one's diagnosed. I mean, it's like early kidney disease, but they haven't run a routine blood test in like five years because they don't trust conventional practitioners and they're only seeing alternative.

And alternative people typically don't do any routine lab work. I see I see a lot of that in my practice. I see the

referral from one person to the next to the next, and no one's really had a real good workup.

They just kind of walked into their five minute medical appointment, and they even show like, abnormal signs of early kidney disease or, yeah, some kind of potential hepatitis.

And I'll come back, we'll check it again later. And like, they never go back or they gets ignored and then you like what do you have hepatitis C you have like yeah stage two kidney disease.

And no one told you, you know, like so then I'm low time. So I think and then happens with more people that don't have fatigue, but they're just tired all the time now.

So I think ruling out actual pathology is is a key factor that gets overlooked. Well, there's some people that have like malignancy early stages and you know like the immune system failed.

White blood cell counts drop. Natural killer cells can be really high or low. So we'll do like a liquid biopsy gallery screening test to see if they have any fragments that that'll screen to like 80 tumors at once.

And even at times we'll do a full body MRI scan. And studies have shown that's been very effective to finally tumors without the radiation exposure. So it's kind of like it's a red flag.

So for me it's like an intermittent fatigue. Some be better than others. And then we'll look more like this physiological left eye mechanism. If it's like fatigue all the time then we got a rule a disease rule out pathology.

And if they are like really pathologically fatigued where they just can't function at all, then we're really thinking that they may have. And this more progressed mitochondrial autoimmune type responses.

And then the goal is really trying to improve quality of life. And but we can't in that case we might put them on lots of different sort of course to see whatever we could can't we can get and just trial and error and kind of working through it.

So that's how I approach it. I want to add like one layer of context or addition to this, this story that, that you've mentioned or this, this, way of looking at things.

There was a paper came out maybe ten years ago or something like that, and it was basically evidence based guidelines for physicians to treat their patients with chronic fatigue.

I'm going to say evidence based, quote unquote. It was published in the Journal of the American Family Physician. And it said, as far as how patient, how physicians should treat their patients with chronic fatigue or, or, look to diagnose them.

Initially, it's run a standard blood test, and they specifically said 95% of cases there is nothing found on those tests in in patients with chronic fatigue, nothing found that explains their chronic fatigue.

So, you know, 95% of the time you're in the categories that you've just outlined. It's like maybe 5% is going to be in that category where there's some serious underlying disease.

95 out of 100 people who are complaining of fatigue are probably going to. You're not going to find any serious underlying pathology or disease that's that's present.

Yeah, absolutely. For sure I would I would say, but that depends on your population sample too. But if you have a population sample of a person being chronically sick for a long time and not having a routine workup for a while, yeah, maybe it's 7.5%.

Maybe it's that no, no it well in your in your demographic like you've established yourself in, in this unique niche where you're like the most brilliant, you know, functional medicine practitioner who, who trains the functional

medicine practitioners.

So you're like the last resort after somebody has been to five or 10 or 20 other practitioners and nobody can help them and nobody figures it out. It's like, okay, now I need to go see titties.

He's the guy. So I'm sure your your percentage is probably like 50%. I have some some underlying serious disease, but it's but most of the people like you said just have like these little things that they're not going to show up on routine lab work.

They don't have disease. Right. Is there physiological things that we don't have parameters to look at? And obviously the organic acids and some of these functional medicine tests are going to capture that.

And ultimately it goes back to you. Do you have more endurance? Is your endurance level changing? What interventions to be done that are changing your endurance and your energy levels?

And that's like the biggest thing I always when I work with my patient population, I always say, listen to this is this is an emotional endurance game.

Like we have to like make a plan, write it down, check things off, circle things, go through stuff. Muscle. Lead your body. Let your body tell us what the response is and also we can go through that, but there's no way we can throw it out.

And yeah, sometimes you get lucky and sometimes it takes forever. And sometimes, you know, the practitioner times, I'll work with the patient and go, I'm totally failing you. I don't know what else to do.

I'm really sorry. It's like what? You just saved my life. And I'm like, what? Every day. You still complaining all the time. They're like, no, no, my quality of life is like, better.

And I'm like, okay, so then that's good. So know it's it's it's difficult. And I think, for people that are suffering from like mitochondria issues, chronic fatigue issues, you really a lot of the treatment is in your hands like you don't really, you know, you really can activate you really can try to focus on your sleep.

You really can try to find things that I like. For example, person can't sleep. The question is, why have you gone to sleep city to have sleep apnea. Yeah. Frequent urination.

You know, for some reason you have like, overactive bladder at night. Do you have a prostate issue? Do you have poor bladder muscle tone? Has it gotten older?

They need to contract and do some people exercises. Or maybe like if you can stop your name like five times a night, you can actually start getting rid of this mitochondrial debris and you can start to actually recover from your health.

And, you know, obviously train other pathways too, that they can sleep. But those are like the fundamental things in as a person, like you said, who sees other some of the key.

So the practitioners have referred to me. It's rarely ever you didn't take this supplement. It's always like a rolling goal.

Chronic Illness, Testing, and Practical Treatment

The next two months is to see if you can sleep from 3 hours to 6 hours. Nothing else. Like that's what we're focused on. So if we can't do that, we can move on.

Yeah, yeah. With that in mind, I want to just loop back to that paper I was just referencing. And the reason why I said quote unquote around evidence based is as far as, again, these are guidelines for physicians to treat chronic

fatigue.

Yeah. Patients with chronic fatigue. They offered four treatments. Number one was a recommendation to walk for half an hour a day. Okay, I have the least problem with that one.

Yeah. Eric, they had cognitive behavioral therapy. They had antidepressants, and they had stimulants as needed. Antidepressant drugs and stimulant drugs.

Those were the only four treatments discussed in the paper for these so-called evidence based guidelines. To give you to emphasize this, nutrition is not mentioned at all, or medic stress and mitochondrial biogenesis are not mentioned at all.

Mitochondria are not mentioned at all. Sleep is not mentioned at all. Circadian rhythm is not mentioned at all in this paper. Toxins not mentioned at all. Right.

None of these things are mentioned at all. So so this is this is really a paradigm issue. This is conventional medical paradigm is is seeking drug cures for diseases.

And you know, this stuff that you're talking about isn't even within their they don't even really have the right conceptual framework to even think about these kinds of things in the right way.

Oh, I know it's very frustrating. There is a survey. The instruction I did, I don't know, was 15 years ago, so a long time ago. And they asked the medical physicians that jumped into functional medicine, why are you here?

What was your motivating factor for when functional medicine? And the number one answer was they got sick or a family member got sick. And then now I don't I'm not thinking through this the right way.

I don't have the tools. It's not disease based physiology, functional based. And what I think things are changing. I think, you know, the people, the people are demanding more information is getting out there more.

But the other thing about functional medicine, too, is it is a patient treatment model or a patient model where we need an active participant. It's not like a passive model.

Here's a beta blocker user base inhibitor. Just do what you're doing. Make sure blood pressure is controlled. Here's a next polypharmacy list of things that you need to take.

It's it's really like, okay, you got to sleep. You've got to move. You can rhythm, you better reduce your toxic load and then kind of go in through the whole process.

So for me, it seems like the patient population that is attracted to functional medicine is highly intelligent through critical thinker. And they're looking deeper because they realize, yeah, I don't have disease, but I don't trust that person anymore.

And then unfortunately, it led to mistrust and now they don't get conventional workups. And then we get, you know, people have disease that does it's you know, it's an ugly mess.

But your paper you mentioning is exactly right. You know what's interesting. And I love this conversation. I always love talking to you. And I always come out of it smarter and learning new things.

But what's what's really cool in this I learned a lot I it's cool. Thank you. That's a that's a that's a great honor for me to hear that from someone like you.

But what's, what's really cool to me is, you know, I perceive this, this whole landscape of the medical paradigm and studying disease, studying pathology and there is this, this like real, endless infinite complexity that you can go down with studying this disease and that disease and what are the specific biochemical mechanisms.

And there's constantly new discoveries of some new layer of abnormal biochemistry associated with this disease and that disease and the whole focus of the medical paradigm and even lots of people within the, the, the more natural and functional medicine is to sort of delve more and more deeply into understanding the intricacies of all this abnormal biochemistry, with the idea that eventually, when we understand that deep enough, we will find some intervention, whether it's a drug or a nutraceutical that interrupts that pathological process, that abnormal mechanism, and that will create health.

Right. And and what I love about this conversation here with you is hearing you talk about essentially lifestyle medicine as the central thing that someone needs to get better.

It's like you're you're you have maybe more than anyone. You've you're more brilliant, more knowledgeable about all that crazy detailed biochemistry of all these different disease processes, 500 fold more than I am.

And yet you're coming back to essentially a lot of the same recommendations that I'm arriving at without having spent so many years delving into all of that.

The study of all the complex biochemistry of disease processes. Well, I think there's an ultimate real truth. And I think when you're actually looking at working with people that are ill, like the truth is going to be what works.

It's not going to be like these theoretical models of this molecule for this. And and at the end of the day, I think, I think the difference of models also when you look at the and of course I'm not anti medicine, you're an anti medicine.

But at times we're just critical thinkers who have had that many balls being approached. But you know when you look at the top prescriptions, you know, beta blocker, Ace inhibitor, eating Curtis inhibitor, protein pump inhibitor, everything's blocking and inhibiting.

We don't have, upregulate or shouldn't have things turning on. Things and things that turn on things are like we talked about Hermes and sleep and lifestyle, things that make a difference.

Now there's definitely a place where you're supposed to. It's just it never supersedes the other variables that the more lifestyle based in the sense.

But this. Then there are some people, like I've had some patients who were like, they can't sleep, they live, and maybe poor reason they can't sleep because they're hypoglycemic all day and they just don't make enough glycogen to they can't get through the night.

And we have to get them to maybe to protein at night. And then sometimes, like they can't shut down a little bit, we may have them, we give them a little bit of valerian to help them start to initiate that circadian rhythm.

And they'll start to sleep. And then we start to have more interest in rhythm. They can start to get out of the rut that we used. You know, we didn't use them.

We used a Gaba agonist, some kind of natural non-addictive to try to get in some sleeves and function. So so, you know, a combination of those things are important.

It's not like 1 to 0. We need to do a lot of everything. But but fundamentally it's trying to improve physiology, improve function. And like you said, like if someone was really ill and they moved as much as they were able to, they got sun.

They were healthy people that they looked to be around socially. They got to laugh. They get to have a sense of self-worth. They got some acceptance. You know, they ate real food.

They slept well. They're probably going to be healthy. It's a mess. Things get started. Worse things go wrong. Yeah, yeah, absolutely. Doctor crazy and I absolutely love this conversation.

One of my favorites of this entire summit. And it is always a great pleasure and honor to speak with you. Are there any final thoughts that you want to leave people with?

Maybe especially for people dealing with complex chronic illness who have been struggling for a long time? Anything you want to say to them? Well, I would say you can do a lot of things on your own, like you don't have to.

First of all, don't be. If you're passive, you won't get better. If you're a passive patient and just want to have someone recommend that things for you, you won't get out of chronic disease.

Getting of chronic disease requires active participation on your part, so if you're fatigue and tired, the things we talked about are really critical, like you have.

For example, if you have chronic pain, you have chronic fatigue issues. You have to get some movement in. You don't have to go and run a mile or something.

You just need to do whatever movement your body can handle and then just a little bit more. Either army that will have a profound impact, especially if you monitor it over one week, six weeks, eight weeks, ten weeks, to see what it does to your system physiology.

It will be painful and difficult emotionally every time you have to do it, but that's really kind of what it takes to to pull through with it. And if you could just get that in and then really try to figure it out, if you're sleeping well, we can do for sleep.

And maybe the reason you're on the summit is because you have mitochondrial issues and fatigue and exhaustion issues, and you can't recover those two little things that you could be control that no one else can can be profound.

Yeah. You know, there's one thing I want to draw attention to that, that I love about the way you've you've you've talked about things is self-experimentation like you've talked about as a, as a practitioner, that you're kind of going through this deductive process of figuring out maybe it's this, maybe it's that, let's experiment with this, let's experiment with that.

And I want people to hear like, Doctor craziness is one of the most brilliant minds in all of medicine. And he's he even he doesn't have like, hey, I've got the answer.

You just do. Step one, step two, step three. And I fix everyone instantly. It's it's a process of figuring things out and as, as individuals listening to this, what I want to get across to you is you should also be seeking as much knowledge as possible, become as as scientifically literate as possible, and operate from the principles and the paradigm that that's been outlined here by Doctor Cardassian.

And then try to have an attitude, a positive attitude, being as, as he said, proactive about trying to trying new things and experimenting and, and being part of your own solution rather than just sort of being a passive patient.

So I agree, I will say one last thing. Yeah. The one key factor I've in my career I've seen really make a difference for outcomes unrelated to the disease, a sense of purpose.

And now there's all this new research on my injury with. That's a key factor in longevity, too. So you gotta also make sure you have a sense of purpose.

Yeah, absolutely. A doctor crazy. And where can people find you, follow your work and in touch with you. Where do you want to direct people? I just have a website called doctor K News drknews.com.

That's that's the main place to go if you're interested in things are Derek thank you so much. My friend. It is always a pleasure to chat with you and I look forward to the next one.

Awesome. Thank you. Thank you for tuning in to Doctor Talks. We hope today's episode has enlightened and

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