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

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Introduction to Mitochondria and Health

So welcome, Dr. Kharrazian, and such a pleasure to have you. Thank you so much for joining us. Thank you very much, Amir. Okay. So first of all and 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 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, it 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 of 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? Yes, a good question.

So ultimately, if you look at the studies on longevity, the key thing that they find in centenarians and people that are living healthy lifespans without chronic illness is that their resiliency and resiliency could be like, you know, temperature resiliency.

They could be immune resiliency, blood sugar resiliency, cognitive resiliency, physical exercise, resiliency and resiliency can easily translate to how effective the mitochondria is in the systems and even of 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 through different proteins, you know, 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 good at, say, not only longevity mechanisms of aging, but a person's ability to recover is like directly related to their fitness of their mitochondrial systems.

So if you have, let's say, three different people 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 things, like the example to try to manage, if you will. Both people well, the one that has greater mitochondrial efficiency probably can recover faster.

So it is a viral infection that one has. Probably greater mitochondrial integrity is going to recover faster. So whatever this condition is in our ability to heal our selves, homeostasis is all energy dependent.

So in if you look at any, you know, so many biochemical pathways, he's all this diagrams and charts like that all runs on ATP and in 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 mitochondria of mitochondria biogenesis. They requires activation.

It will clear mitochondria mitophagy and you know, things like lack of sleep or, you know, overeating or hormone deficiencies. All these things can impact how we clear out these different hormones.

I mean, these mitochondria proteins and 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, and then we're like, okay, the mitochondrial system is inefficient.

And then the question is, what kind of fatigue do you have? And you know, the next, which is what do you do? And ultimately, when we look at mitochondria from a clinical perspective, the mitochondria has needs, the mitochondria has to have glucose and or ketones one of the other.

But let's just include glucose for now. But if it has glucose and then it can, it's what it needs the substrate to run the process is if someone gets fatigued after meals or get Chicken Little between meals, you already know a mechanism where the mitochondria can't function.

The mitochondria needs oxygen. So if someone has asthma and we hear wheezing and they have some allergies that are respiratory, we know they're going to be inefficient.

So it is anemia and they can't carry oxygen. The mitochondria, which we know that there's not going to be a chance for recovery.

Mitochondria, Fatigue, and Clinical Clues

You know, in a clinical setting, we have like dealbreakers, like there's no way they're going to be able to recover because their mitochondria isn't able to produce ATP and and get those things to work.

We know the mitochondria extremely sensitive to free radicals, oxidative stress so like chemical loads they created them to respond to 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 causes of fatigue? How many markers would 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 that are impaired, that recover that can recover quickly from 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 recover from my workouts. It was a clue to us that their 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 this muscular mitochondria, I can't I can't read as many chapters as I used to. I can only read like three pages and it that's brain mitochondria.

So whatever system we're looking at we will see is mitochondria fails is 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 that fatigue is one of the other things that may be actually red flags of what the mitochondria needs, that we need to find that interim in fatigue, that they have fatigue all the time, or is it the integrity and debilitating fatigue?

We worried about things like cancer, malignancy, autoimmunity to the mitochondria, which we see with people that they have, you know, like the so-called chronic fatigue patterns and, you know, things like that.

But that's kind of the thought process that exists. Kind of rambled on. But you answered a question. I start, Doug, you. Know, that was great. And I love that you've presented resiliency at the at the beginning of your answer as a sort of foundational aspect of your answer, because this term resilience is something that is it's 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 as you said there, it's, it's all about stress buffering capacity at the cellular level.

And stress buffering capacity is essentially 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 gave 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.

Absolutely. 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. The 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 executive pathways. 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 could be a little confusing. Where things go wrong is like people will hear about mitochondria function, they get, oh, we need some coach you ten we have some coach you ten and we had like really fancy niacin and cinnamon eyed and, you know, nutrients like that or could knowledge and all or something and everything is going to work.

And it's like, no, this clinical setting, we see chronic patients, they're coming in with bags full of supplements. They're, you know, they're not it's not 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 thick 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 Mitophagy or these different pathways.

Now, ultimately, like for me, I see a lot of patients that have traumatic brain injuries they work with. We're trying to help them recover. We'll see patients that have like chronic illnesses and they 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? Because we can change your mitochondria concentration in our tissues and cells by things we do, right.

So if you look at the literature, what they're looking at is the signaling agents for mitochondria, 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 killer messengers that can and can theoretically produce many contra, but they don't produce mitochondria. They just turn on the messenger pathways.

And then what you actually have to produce many hundreds activation. So you actually have to stimulate movement and you have to have more misses and the stress to the system to, to make those things work.

Yeah. So you know. If of it's the analogy that that I often use is, 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. It's the same thing we would do like neurological rehabilitation if some 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 news. What you're going to do? The range of injured now has to reconnect.

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

Back to the scenario, if a person can't read a chapter, they can only be three pages and said, well, the 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 and then maybe four pages.

And if you're 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 to all different tissues in the body.

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

So one of the key things is there has to be some kind of movement, has to be some type of activity tolerable to what the person can handle. You know, and I remember meeting a mentor a long time ago.

She goes, listen, don't get sick. You got to get them to move or they'll never recover. I don't care if they're thrown in a lake, you know, in a barrel and they're just paddling away or whatever they need to do.

Yeah. And I've actually used the analogy that some patients that had been severely ill like and like just lie on 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 several times 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 hormone effect.

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

Biogenesis, Movement, and Recovery

But if that action doesn't take place like that stimulation to turn on these protein messenger pathways to proteomic pathways to generate the activation of mitochondrial biogenesis, we actually turn on these production and these people cannot recover.

So this is the problem with this supplement game and 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's people like I've had patients that say I can't. They go outside to get the mail. I'll be in bed for the rest of the day. I can't do that. And those are like the most severe kinds.

So, you know, for them, you might want to have to that can reduce the load with other factors first and then but then encourage them to go get the mail and get some movement.

It's like there has to be some degree of or misuse or suffering to these mitochondrial biogenesis pathways. And I think that's one of the biggest things I see neglected in the clinical setting world is emphasis on everything besides that.

This is why I love you, Dr. Garcia, 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 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 hard recess 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 micro 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 PCU 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 a essentially in the modern lifestyle causes a loss of about 75% of the mitochondrial capacity.

By the time a person is seven 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 the 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 hormones us in your in your answer there. I'm wondering if you can speak to kind of this 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 there with mitochondrial that's in organic acids test or the urinary and I see this beautiful map the lab points out in metabolite it's a mitochondria and it appears this function like you need to think that that's a ridiculous model I don't actually remember talking to one of these labs that does so they go, Why are you selling this nonsense?

Like 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? A real clinician never wrote any of this stuff. Yeah. And then, I mean, it sounds like it's very scientific and I think people drawn with that.

And you know, there's a point where I just almost have given up on health care practitioner 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 is like, tell you what's happening in the cellular space and then what should happens to the practice to the patient is they get a supplement overload of stuff.

They get all this money spent on extra diagnostic testing. They may not still have any any outcomes who benefits? Or maybe once someone actually helped them, but is totally unrelated to the lab test.

It's just something their body responded to and then like, oh, 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 in a in an in particular.

I'm not a big fan of the organic acids test. I think most metabolites first of all, from a laboratory perspective, working in labs as a Ph. D. 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 him like dice and said, I'm going to give you a dice test, and every time six comes up, I want you to use Cookie ten.

Every time one shows up, one should use a multi vitamin product or whatever and someone comes in to go get a six. Okay, 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 in this little frustration, I also the biggest the biggest clinical indication that a patient in mitochondria is improving is their endurance for whatever they could into improves and their fatigue or if their energy levels themselves can be changed.

But the first is going to start with the dirt. So now they can do things longer. They're not fatigue as much, whatever it may be. Right? So that's the key thing and resiliency.

So now they can eat maybe a meal and they're not totally passing out. Now they can go 3 hours down to be on the couch, which is not dropping now. They can lose a night's sleep and they're not getting cold in the next day.

All these things are resiliency and resilience is a big part of it is mitochondria 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 sciencey 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 mean it must be very frustrating for you interviewing all different types of people.

I It is often, yes and I'm very happy and to be honest, a little surprised because 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 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.

And 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, if 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. And that's one of the red flags for me when I see a file come in from another practitioner, if they've done a lot of testing, I'm like, they're new, they don't have to do it.

And then like the more seasoned practitioners are doing a very detailed history and then they're making some of like realistic goals.

Critique of Functional Medicine Testing

Read four pages instead of three, you know, do the mailbox comment, don't get busy with standards again on repeat. And then those become really noticeable things to to monitor ultimately with with just chronic cases.

It really is a trial and every game. And I remember talking to congratulate him like, listen, I'm at the point where I don't trust what anyone else says because that an author biases in their ability to interpret the information is having a hard time trusting a lot of research because we as a P-value.05 for every study, which means the study is perfect, 120 are wrong and no study is perfect, then it's like, okay, so even one of this study, we don't have enough like to do a mat analysis.

Okay, I'm looking at the same piece of information. I look 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're like, okay, well, I'm just have a bunch of stuff that may or may not be effective. And, and, of course, it's useful to see anemia on a CBC and things like that, but they're 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 through trial and 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 that is improvements. And if they don't recover, then it's also diagnostic meaning that's not where we need to go and then you guys go through the whole process.

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

There's something very attractive going. Okay. Oh, I have, I have motor oil toxicity or I have Lyme disease, I have heavy metal toxicity. It's like 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 mitochondria like mitochondrial genesis, the key thing the key thing with mitochondria is what we've been talking about getting Horace is getting activation, getting that proteomic message to actually make these mitochondria and we can all make in I mean the more movement the more activity we have with cognitive stimulation, we have more challenges.

We have to resist in the moment. It kind of we can make. And then the next thing is really getting rid of unhealthy mitochondria, this whole mitophagy pathway because we have like only so much space in a cell, 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 and this and if you if you look at all the research on Mitophagy, the clearing out of these unhealthy mitochondria is a period of time they just wear out.

So as they make energy in ATP, these cells become less efficient and then we have to get rid of them and getting rid of them, not have space for new ones to come in.

So if this mitophagy path we were clearing out of unhealthy mitochondria that have kind of worn out over time, is it working? And it's a big problem. And that goes back to just like sleep, like you going to 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 our debris cells to top, top off.

So like movement activity and getting proper sleep, probably some of the best remedies for any kind of fatigue endurance tissue than any nutraceutical.

Yeah. And have you paid attention to this this emerging line of research and especially with Russell writer around melatonin and mitochondria there's there's been some pretty new and I think I think will when all is said and done 1020 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. Have you seen this research yet? No, I've seen it.

Oh, interesting. Okay. Have you always been of stuff I've never heard of? Okay. You're going to love this. All right, so it's. It's it's super interesting.

And I think you're going to be fascinated by it. So there's Russell Writer 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 and catalase and heme oxygen, and some of those other internal antioxidant defense system to recharge that that system at night while we sleep along with, you know, mitophagy 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 and they found that in mice with no pineal gland that they still have the same levels of melatonin at the mitochondrial level.

And and then they discovered that mitochondria melatonin is so important to mitochondria that mitochondria actually produce their own supply of melatonin.

Wow. And and that interestingly or stress especially exercise, stimulates an increase in that likely to help balance the redox held balance to the oxidants that are also produced and especially red light.

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

I think it's going to be an important layer of physiology and I'll share the research with you after we get all the

wonderful. Yeah yeah makes sense. I mean, I know for sure as we sleep when the pineal gland itself is producing melatonin, it primes immune system and activates mitochondrial pathways for for fusion vision and it haffajee 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 more music, you have to have stress to activate them and then you have to have sleep, get rid of them.

And if you're not sleeping well and also circadian rhythms just like a general circadian rhythm, is really critical. So the other thing in my go through with patients that are having issues with endurance issues, I mean, they want to rebuild their mitochondria is we can we get them to move with whatever limitations they have but try to induce promises so it's difficult for them.

It's not like they can walk. It's no problem. We 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 want to do it physically.

There were those challenges may be and then we really want to focus on making sure they get enough sleep and improving the 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 brain injuries and brain injuries is a massive insult to mitochondria and neurons, and that impacts to recovery.

If we don't do those things, they can't recover like this. They have to, you know, have proper sleep, proper premises, activation and normalizing a circadian rhythm to really make that system work.

So that'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 activation and stimulation? There's like there's some people who completely crash when they tried to increase the their armies.

It's like working out. Yeah, to me. This was my next question. I'm glad you brought it up. Okay, so then for me, want to go? Okay, well, what kind? How do they crash and what caused them to crash?

So any kind of physical exercise, I'm 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 whole series of antioxidants for them, like green tea, resveratrol, turmeric and or, you know, whatever the series of cocktails off my book acid.

And they see and to see if that load over the next few weeks can serve to impact their endurance. Can I interject one one thing very briefly? You know, 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.

Mitophagy, Sleep, and Circadian Rhythm

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 realize that sunbathing is really, really important. Getting adequate sun on our bodies is an is 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 doing to you, you'll understand. There's a lot more layers to that story than than 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 more than just vitamin D. Yeah. Wow, that's really interesting. But, you know, it brings up the point of these antioxidants and these systems, that's another area.

So it's not one of the key things that we have to make mitochondria in our system is to clear mitochondria. The other one is mitochondria are very susceptible to free radicals, inflammatory mediators and so forth.

And there are 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 in 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 for me.

Not it doesn't. Then we know that my condition for some people, they may notice some change. It may not be 100%, but maybe like 20% or 30% or something.

They they definitely notice it when they miss it. You know, when they read one of the red flags for me is also when I see my patient come in, they have a list of all the symptoms they take and they get, okay, you're you're stuck on an island.

You can only take three, three cell phones with you. Which ones? So don't want to take hundreds of 14 and what are the priorities? And if they like, oh, I got to have my next little sustained I've got to have my green tea.

I have to have, you know, this like these are all in talks like okay, we just need to boost your levels of. Mm. And, and then, then we're pretty much, much more cautious in the recovery and then and then that's where you really like for me that's when I go, I really want to take a deep dove into things that a couple of mitochondria their quality in their home that's the huge one for me I always like to check their air quality, make sure that air filter, you know their home base.

So then you look at chemicals, but I'm not looking at exotic chemicals. I want to look at chemical load in their home and then see what we can do to mitigate that.

So I always use air filters. I'll try to make sure that they know they're using ceramics and glass and, you know, and just go for three, four cookware, bakeware and storage foods and things like that.

So we'll go through the whole like try to restore chemical of that way. We may even check chemical levels with different profiles and see if they have any elevated levels in and see if we need to support their bio transformation pathways and go through that.

Now that only happens 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.

Yeah. Right. Since those people that have a high chemical load. But there are many symptoms. They have a pretty good antioxidant bio transformation pathway that even though they have this load, it's not devastating for that.

Right. So this is the other variable, the other factor. So then I want to like so then I'll go through and just start to look at what things impact through bio energetics, 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 you know, they can have a bad day or a good day.

So that's like what I call interim in fatigue, patient enough to intervene. If the equation are totally different, then every day is terrible. I can't get out of bed. I can't function.

That's a whole different. What's what's different physiologically is it can you. Well, first of all, I think a lot of these 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 mitochondria proteins that have been published on like people that have severe fatigue mechanisms. But 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 at least in the clinic setting that and skills I have to try to help them with what I can do as a functional as a practitioner.

Those are people that come in to go, okay, we got this nailed with they get you fixed up. It's almost, you know, and sometimes they do have like serious there are some like examples of people actually do get mycotoxins exposures.

There are people that really do have toxic more than they really get sick from them be you know, they're not as common as people think, but they're definitely there.

There's some kind of severe illness like, a micro toxin poisoning or something like that that sometimes comes up. Sometimes I had this one person who is working and they would have these busses turn on and he's working in his is managed like a executive in a hotel and every morning they would 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 that for like two weeks. So I feel a lot better. It is like, okay, but. Yeah, it's, it's amazing down here in Costa Rica and everybody leaves their engine running when their car when their car is stopped and they're hanging out next to their car, they leave.

They're enjoying it 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 load it 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 turn the engine off.

But, you know, imagine somebody doing that job where they're 4 hours every day breathing those exhaust fumes and they don't think anything of it. Well, exactly.

So those are the things that, you know, like you take a deep dove into a car and you start to think about it. And a lot of times, like the patient themselves, they like you really think it's that and like why we try.

Yeah. So, so we'll try to try to find any sort of a chemical 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 relate issues. Blood sugar is always a big one. There can be a lot of people on blood sugar issues. There will definitely impact on mitochondrial functions.

You need to have glucose to to make ATP. So we'll look for the classical symptoms of this glycemia admirable sugar levels by asking how do you feel after you eat?

And then all the answers should be not angry. Yeah, if they say I feel energized, they can focus, they can think I can concentrate again. And that's a sign they were hypoglycemic, so they may be going along with that eating and have epilepsy mechanisms to address and those they can really tired of the and we think the mass of insulin resistance issues.

And that could be if one of the factors where they're not carrying glucose into their cells to feed their mitochondria. So, you know, a lot of times, you know, you get a chronic exacerbation and you like get them to move, develop activation of mitochondria, Biogenesis, get them to sleep properly, start to get in normal circadian rhythm, stabilize their blood sugar levels.

And we may not even use any cell phones at all. And finally starting to recover now the list of 100 supplements is like with that kind of way. Now, sometimes supplements definitely do help make nutraceuticals do help, but they're never going to work on their own.

Like yeah there is an interested was going to do those mechanisms with mitophagy and mitochondria fusion and make sure you get Genesis and it's just not going to happen.

So those are there are the strategies that we trying to do it.

Antioxidants, Sunlight, and Melatonin

So it's almost really more of like a lifestyle medicine approach that there are like various factors like people do have toxic mood is sometimes very about transmission pathways not working, but it's that's kind of the real game, the real game is not a nutraceutical issue.

And there's people that have, for example, do have hormone deficiencies or actually do have hypothyroidism. There are people that have the underlying diseases.

No one's diagnosed them have 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 mean, I see I see a lot of that in my practice. I see the referral from one person to the next, the next. And no one's really had a real good work up.

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

No, come back. We'll check it again later. And like, they never go back or it gets ignored. And then you're like, what a Pango you have hepatitis C, you have like stage two kidney disease.

No one told you, you know, so then long time. So I think that happens with more people that don't have it fatigue. They're just tired all the time. Yes, I think ruling out actual pathology is a key factor that gets overlooked.

Well, there are some people that have like malignancy, early stages and like the immune system failed white blood cell counts, drop natural killer cells B really high or low.

So we'll do like a liquid biopsy like gallery screening test to see if they have any fragments that'll screen for 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 intermittent fatigue, some basic better than others.

And then we'll look more like the physiological lifestyle mechanism. If it's like fatigue all the time, then we get to rule out disease, rule out pathology.

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

And then the goal is really try to improve quality of life with whatever we can. In that case, we might come up with a different nutraceuticals to see whatever we can we can get and just trial and error and, you know, kind of rookie through it.

So that's how I approach it. I want to add like one layer of ease of of context or addition to this this story that you've 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 look to diagnose them initially, it's run a standard blood test.

And and they specifically said in 95% of cases, there is nothing found on those tests. 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 five percent's 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 any serious underlying pathology or disease that's that's present.

Yeah, absolutely. For sure. I would say that as in your population sample too, but if you had 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 seven and a half percent. Maybe it's not.

No, no. Well, in your in your demographic, like you've established yourself in this unique niche where you're, 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 who's been to five or ten or 20 other practitioners and nobody can help them and nobody figures it out. It's like, okay, now I need to go see the he's, he, he's the guy.

So I'm sure your, your percentage is probably like 50% some some underlying serious disease. But it's but most of these 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 test are going to capture that.

Yeah. And ultimately it goes back to 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 would say, listen, it chronic. This is a 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 list.

Let let your body let your body tell us with the right responses and let's we can go through that or there's no way we can figure it out. And sometimes you get lucky and sometimes it takes forever and sometimes, you know, as a

practitioner, times I work with a patient and go, I'm totally failing you.

I don't know what else to do. I'm really sorry. Like what? You just saved my life. And I'm like, What? Every day you're still complaining all the time.

They're like, No, no, my quality of life is gigantically better. And then, okay, well, then that's good. So, you know, 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 are like, for example, a person can't sleep.

The question is why have you asleep city? Do you 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 as you've gotten older? They do contract and do some people exercises or I mean, like if you can stop your name at night 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 trying to other pathways, too, that they can sleep. But those are like the fundamental things. And as a person, like you said, who sees other you know, some of the cases of the practitioners have referred to me, it's rarely ever.

You didn't take this supplement. It's always like our only goal in 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. 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, as far as again, these are guidelines for physicians to treat chronic fatigue. Yeah.

Patients with chronic fatigue, they offered four treatments. Okay. Number one was a recommendation to walk for half an hour a day.

Finding Root Causes and Rule-Outs

Okay. I have the least problem with that one. Yeah, they had cognitive behavioral therapy, they had antidepressants and they had stimulant 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 to emphasize this, nutrition is not mentioned at all for 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 here. 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.

Yeah. No, I know it's very frustrating. There was a survey, the answer function that I don't know was 15 years ago was 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 a functional medicine? And the number one answer was They got sick or a family member got sick, and then they're like, 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 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 to it, it is a patient treatment more or a patient model where we need an active participant. It's not like a passive model. Here's your beta blocker.

Use your ACE inhibitor, just do what you're doing. Lacie Blood pressure control. Here's a next polypharmacy list of things that you need to take. It's it's really like, okay, you've got to sleep, you've got to move your skin rhythm.

You know, you've going to reduce your toxic load and they're kind of going through the whole process. So for me, it seems like the patient population that is attracted to functional medicine is highly intelligent.

They're critical thinker, and they're looking deeper because they realize, Yeah, I don't have disease, but I don't trust them any person anymore. And unfortunately it's led to mistrust and now they don't get conventional workups.

And then we get, you know, people disease that it's you know, it's an ugly mess. But your people 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 and. This I learn a lot over time. That'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 it's 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 medical paradigm and even lots of people within the that 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 in 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 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, but 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 in models also when you look at the and then of course, I'm not into medicine, you're an anti medicine.

We're going to miss it. We're just critical thinkers of how that was being approached. But, you know, when you look

at the top prescriptions, you know, beta blocker or ACE inhibitor, HIV Curtiss inhibitor, proton pump inhibitors, everything is blocking and inhibiting.

We don't have up and things turning on things and things that turn on things are like we talked to her rhesus and sleep and lifestyle, things that make a difference.

Now there's definitely a place for nutraceuticals too. It's just it never supersedes the, the other variables that are that are 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 maybe poor reason, they can't 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 empty it maybe to protein at night and then sometimes like they can't shut down a little bits, we may have them give me a little bit of valerian to help them start to initiate that circadian rhythm.

And they'll start to sleep and then we'll start to have monitors can rhythm, they can start to get out of the rut that we used. You know, we didn't use it.

We used a GABA agonist, something very natural, non-addictive to try to get in some sleep, some functions. So, you know, a combination of those things are part.

It's not like one is the we need to do the little thing 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 unhealthy people that they love to be around socially. They got to laugh. They get to have a sense of self-worth. They get some acceptance.

Lifestyle, Purpose, and Patient Participation

You know, they eat real food. They they sleep well. They're probably going to be healthy. Yeah. So it's those things get the, the story where things go wrong.

Yeah. Yeah, absolutely. Dr. Carolyn, 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 in 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 recommended things for you, you won't you won't get out of chronic disease.

Getting out of chronic disease requires active participation on your part. So if you're fatigued 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 in the arms of 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 pull through with it.

And if you could just get that in and then really try to figure it out if you're sleeping while 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.

And, you know, those two little things that you could be control that no one else can can be profound. You know, there's one thing I want to draw attention to that that I love about the way 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, Dr. Kazianis 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's been outlined here by Dr.

Kharrazi. And 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 being part of your own solution rather than just sort of being a passive patient.

So I would 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, the sense of purpose.

Hmm. Yeah. And now there's all this new research on Orangeville. That's a key factor in longevity, too. Too. You get also make issue of sense of purpose.

Yeah, yeah, absolutely. Dr. Crossin, 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 Dr.

K News Drake NWC dot com that's that's the main place to go if you're interested in things are doing. Thank you so much my friend. It is always a pleasure to chat with you and I look forward to the next one also. Thank you.