Introduction to Mitochondria Testing

Welcome back to another episode of the Restore Your Mitochondria Matrix Summit. I'm your host, Laura Frontrow. I'm bringing you experts to help you boost your energy and fix your health so you can build the life you love.

Today, I'm bringing you Samuel Shea. Hi, Samuel. Welcome to the summit. Thank you. Good to be here. Yeah. Now, this is a really special talk because we're breaking down lab tests, and you are the expert coming on this summit to tell us all about how we test for mitochondrial function.

And a really quick connection that we have. I studied with Doctor Dan Kalish for a year in his mentorship. He's the one who really introduced me to the importance of mitochondria and how foundational this is to all healing.

And he really taught me that no matter what you're trying to do with the human body, if you don't address mitochondria, you probably won't be successful.

It is so foundational. And I mean, you did the same program that I did. You also studied with other mentors. And I'll give you a second to introduce yourself with that.

But we have this big connection. And I was really excited when you said yes to come on here and talk about labs because it's complex, it's confusing. People don't know which test to get.

They don't understand the test. And I'm quite honest, most practitioners don't even understand the test. You really have to study them in depth, like you and I did, in order.

I mean, I spent a year learning one test, so. And I know I could even go deeper on that. But anyhow, you are the creator of the ten pillar method to properly assess the most important and most commonly missed components of health and wellness.

You are literally an expert in all things labs and mitochondria. You have a group of people you tend to work with, health conscious entrepreneurs and mom preneur ers because you want to help them have high performance.

So they create more freedom for themselves and others. And you've really dedicated your life to helping others through functional medicine and functional genetics.

So welcome, welcome, welcome to the summit. Thank you I appreciate it. And and one of the group of people I really love serving is also just moms. Just normal moms don't have to be a mom for nurse.

And the reason I got into functional medicine is that I was supposed to be the third generation medical doctor in my family. My both my parents are medical doctors, psychiatrists, specifically.

Don't hold that against me. And my grandfather was actually the founding director of the Fels Cancer Research Center in 1937 and wrote over 300 scientific articles and made some major advances in in several fields until he actually died on the operating table from medical misadventure in 1965, before I was even born.

And, I was supposed to be the third generation medical doctor, and I took a hard turn into natural medicine because of my chronic just being chronically unwell and the the philosophy at the time, being raised by the two parents that I had was, it's in your head, you need a psychiatrist.

And, physical things going on, whether it's crippling insomnia, digestive problems, low mood, anxiety, depression, chronic pain, postural distortions, etc.

it's primarily a psychological issue or you're not grateful enough for whatever we've provided to you. And there's not there was a very, challenging time.

I went through a lot of school was not helpful. A lot of violence at school, a lot of gaslighting, a lot of willful blindness on the part of the authorities and teachers and, friends and so on.

So it was was a very rough go from age six to age 18. My parents had a nuclear divorce when I was six years old. And, you know, all my sisters were caught in that blast radius and, you think two shrinks would know better, but they would weaponize those kids against each other? It was. It was pretty awful.

And what was happening is, Western medicine wasn't working because the things that I was dealing with, weren't being addressed by the latest version of Zoloft.

And, my, I decided as a teenager to go into natural medicine. And I read Doctor Johnson's Guide to Better Health Care. He's a luminary. He's kind of the founding, you know, grandfather, at this point of natural medicine in the West.

Anyway. And I went on to do pre-med in college and went to chiropractic school, but very heavy into nutrition and especially functional neurology, and then got, practice with within a clinic in New Zealand for eight years.

Got acupuncture degree while I was over there. And when I was over there, I really got into functional medicine and started doing testing while in New Zealand.

And actually, that's when I started studying with Doctor Kailash and, Doctor Kailash. I studied with him for four years and we went super deep into the mitochondria.

And before that, I'm sure the mitochondria was really this kind of vague existential organelle inside the cell that was like super complicated, full of all sorts of 50, 50 point Scrabble words and kind of obscure and difficult to figure out.

And at the time, everyone was blaming fatigue and low mood and all these other things on like adrenals and thyroid, low iron and gut problems, which are have a major contribution, but they kind of left out the mitochondria piece.

And in fact, something for our listeners.

Samuel Sheau2019s Background and Functional Medicine Journey

If you're dealing with, you know, quote, adrenal issues, which, by the way, my first e-book was on adrenal issues. I studied with Doctor Wilson, who wrote the book Adrenal Fatigue.

If you're not finding success with programs for working adrenals, you really have to look pivot to look at the mitochondria, then go back to the adrenals, or at least or maybe do them in tandem.

It's a little side clinical polar. So the mitochondria, became of central importance, because it was just a major gap in my education. And I didn't realize that basically, at the root of all chronic issues, you can draw a straight line over 90% of the time back to some sort of dysfunction in the mitochondria, usually with a major contribution of a gut problem, a thyroid problem and adrenal problem and nutrition deficiency problem.

Like, like all the other problems and all the other systems that all of the clinicians like focus on, eventually wander their way towards mitochondria.

Right. And if and if the mitochondria is structurally sound, and there's just the issue with other organs system and you help that organ system, then great.

But usually there's damage to the mitochondria as a result of this thing over here. So you have to ideally look at

both because the mitochondria are affected no matter what.

And depending on what stage and how early you know what stage you're in and how you catch it, the mitochondria may be damaged to one extent or another.

So mitochondria eventually is going to be end up on people's radars in their health journey. So that's why I've put a major emphasis on it and worked, really diligently to study up on it as much as I can and become highly proficient in not only explaining, but interpreting these mitochondria tests.

So that's how I basically ended up here. Absolutely incredible that you're going to go over this test with us today. Testing. So we're going to do something different on this interview.

We're actually going to have you share your screen, and we're going to go through some visuals because, it really helps to be able to look at pictures while we talk about this.

So this is super exciting, you know, for our audience. So, you know, as you get ready here and pull up your presentation, can you tell us, you know, why?

Why this is so important? Why is functional testing so important when we're looking for. So with functional testing, what? Can you see my screen? Laura?

Yes. Okay. So, let's so into why is functional medicine? Why is functional testing so important? So, let me, let me answer that in just one minute. So let me prepare to answer that question by explaining the, the the system of the mitochondria.

And then you'll see why the testing connects to it. So in summary the mitochondria is a very complex piece of machinery. And the point of testing is to be able to identify which pieces of the machinery needs support as opposed to guessing.

There's a lot of practitioners out there that just simply like hoc whatever the the special curcumin extract or whatever amino acid blend or whatever to support the mitochondria.

And they can say it helps the mitochondria. And that's true. But there's like 50 things the mitochondria needs. So we can either guess and just show to point to a whole bunch of research.

It's all about belt you know, bell curve state statistics of population. So in general people need this thing for the mitochondria. And that's great. But the point of testing is to find out which of the 50 things or combination of within those two things you personally, individually actually need.

So what testing will do is to get very specific, very granular, very personalized. I call functional testing the best of Western medicine diagnostics with the best of natural medicine lifestyle interventions.

And so we have the benefit of the nerdy, you know, the machines that go, you know, to make a monty Python reference in Western medicine. And then we've got all the tools, nutrition, lifestyle supplements, etc.

of natural medicine to actually repair as opposed to patch or numb or kind of maintain or just kind of keep it. Okay. So with with functional, with testing itself, the way to understand mitochondria testing is to understand what the mitochondria is.

It's a that the cell the metaphor is your cell. An individual cell is a city. And in the to run a city you need an electrical plant. So like my grandparents lived in New York for over 40 years and you need electricity to run the whole thing.

Like if you if you have a house with no electricity, it's basically a hut or a tent. And you need to have electricity to make everything work. Otherwise, if electricity goes out in New York City, everyone hears around it.

We're like, why? Because you've got three days where people can kind of get by on batteries and flashlights, but after three days it's going to go full mad Max and you need electricity to run everything.

And the cell is the same way. There are emergency provisions that can last a short period of time in the cell. If your Tricity factory goes down. So if you think about the mitochondria as the very fragile, very important, very efficient, very clean, energy producing factory of the cell, and you hold that image in your mind, then all the other bits, your testing and the nutritional needs that you need make total sense.

So in a mitochondria, like in our Tricity factory has to have walls. So these are specialized fatty acids. So you need to know about fatty acids. The machinery has to have that.

Well the factory has to have security guards. These are your this is your immune system. We have to make sure that, there's, janitors on the inside to clean up any sparks that fly off.

Those are the free radicals. These are the enzymes inside we designed for oxidase. These are the. These are the enzymes that clean up the sparks that come off from worrying the model, the electricity factory whirring and burning fuel in order to make the electricity.

So these would be the free radicals. You've got the machines inside the factory to make everything work and make the electricity. These would be vitamins.

The machines need to have computer chips to run the machines, and those are called minerals. You need to have, patchwork. You need to have you need to have things that are able to like, patch the walls and things like that, like it's just an example.

If there's damage done to it, you need to also have a communication from outside the factory to get, information on how much electricity needs to be sent out.

And if your city is also under attack, you need to like, if it's the Germans are bombing in World War two, you got to cut the lights because it's an emergency, because you've got other bigger problems to deal with.

So if there's the adrenal system influences the mitochondria system, so the mitochondria shuts down when there's an emergency because you can't be operating that.

You have to switch to the emergency candles and flashlights because, you know, the bombings happening overhead. You look at neurotransmitter, metabolites, you look at the entire gamut of nutrition, that goes into the mitochondria, B vitamins, fat soluble vitamins.

You got to look to make sure that your factory doesn't gummed up with toxic chemicals or dirt or tar, or you get, like, bad computer chips called heavy metals that go in.

So you have to look at the liver detox pathways. You have to look including the science, to make sure that you're pulling out. You've got the systems to come in to remove garbage, to remove toxins.

Why Functional Testing Matters

And that's basically the whole analogy. If you understand the mitochondria as a fragile, very expensive but very needed electricity factory, then you can hold that in your mind and, and look at the functional tests, not as a series of complicated Scrabble words that you can't spell, much less pronounce.

It's actually a practical model for you to understand conceptually what you're doing. So that's what the mitochondria is and why testing relates to it.

That is literally the best analogy I've ever heard on on what's happening. That was brilliant. So hats off to you. Brilliant. I may have to share that in some of my classes and but I will always give you credit.

I will say this guy, you you could put on there. Sure you can. You could also you can always feel free to clip and have like that. You know, picture of me with a big smile with like some halo in the background, he explains. The mitochondria.

So by the way, yes, this thing you have and I'm also a stand up comic by as a hobby. And, a quick, quick sidebar, it's important I took I really got into stand up comedy for a number of reasons, but one of which is that my first bachelor's degree was in psychosomatic medicine.

So the placebo effect and for people listening, if you had to pick between two coaches or clinicians you're working with and they're both similar, approximately the same, pick the one you like more.

And I don't mean that metaphorically. I mean that technically, because the placebo effect is, in effect, how much you like and trust your coach. Yep. If you can just reflect on their own experience and reflected on my experience.

If you work with someone that is brilliant but you don't like every suggestion, whether it's a supplement or a diet change or lifestyle change, you'll have this cortisol response.

So at best, your progress will hit a cortisol tinged glass ceiling. And if you really like someone, then if you really like and trust the person you're working with, then you will have a positive emotional response and therefore whatever you're doing won't be crushed down by cortisol and stress.

And I, I have seen I know so many profoundly mediocre clinicians who get disproportionately good results. And they all have the exact same commonality.

They're so damn likable. Oh, right. Right, right. Okay. And and we both know super nerds that have the personality, you know, present company excepted, of course, we know super nerds who have the personality of a doorstop that have protocols that simply glow.

Just glow. But they do not get the results. They should because they're don't they're not likable. Yeah. And it's not about clinical competence. It's about likability.

So me going into comedy has helped me in many ways. You know, be a better writer, a better speaker, but it's also helping you able to connect with people better.

I'm also on the spectrum, surprised and being in comedy has also helped me be able to read people better and to become more likable. So for any clinician that's clinicians that are listening to this, it is a clinical imperative that you are likable for your clients benefits.

This is non-negotiable. Becoming more likable is what you need to do, not something that's nice to have. If you are truly in this to help people be as likable as possible.

So I hope the little that is this is great and and I will say, I know that you are an academic and bit of a genius, and it's rare that we meet those types of people that we actually enjoy talking to and spending time with, and it is because you, you are so fun and likable.

So we have about 30 minutes left to go and do a marathon deep dive on all the different tests. And you know, if you're listening right now, make sure you have your pen handy.

Make sure that you go back and you know, rewind and listen to this because we're going to go deep. And so we're going to cover what are the key mitochondria tests and which ones are the best ones to use and why.

And so we're going to go about 30 minutes okay. Can you do it Sam I oh we will we will we will do it. You will. So so testing. So testing is for people who are either chronically unwell, who are feeling normal and just want to stay maintain.

And it's also for the of the what I call the health aspirants, the optimal performers, you know entrepreneurs and the biohackers testing is not to be done to the exclusion of ignoring lifestyle.

I have a conception called ten Pillars of Health. This is not a temple. This is a health talk, but I'm just to make the point that if you were going to work with someone who does testing, you must make sure that your lifestyle is attended to as a foundation, because the whole reason that people need testing is they have a bad lifestyle, choice or circumstance, which then is interpreted through your genetics and then creates reactive responses in your body.

Inflammation, blood sugar dysregulation, tissue breakdown, free radicals, which then over time will hurt organ systems and then create symptoms and then create coping for those symptoms, which then damages your lifestyle even more, which then leads to more adaptation, more damage, and then round and round it goes.

So where functional testing comes in is it identifies what organ systems are damaged, what process your body is genetically prone to inflammation, blood sugar dysregulation, tissue breakdown, free radicals so that you can create a customized lifestyle nutrition plan to reverse this whole process.

On the premise that you're working on your lifestyle, which started the whole thing to begin with. So testing fits in in this entire process. Genetics is these green arrows that connects the things to one thing to the next.

But the testing is over here in this corner, in this corner, looking at what are the four processes you're most prone to and what organ systems get damaged.

Now, when we're talking about function, we're talking about mitochondria testing specifically. There's originally it was the iron panel developed by doctor Lord in the 70s.

Doctor Lord developed fatty acid testing for functional tests, amino acid testing for functional testing, organic acid testing for functional testing, and the GI effects test.

So he basically is responsible for half of, you know, influencing half of all functional tests that all of us use around the world, period. Full stop. You don't do hormone testing.

But he did all the other stuff. Now, the iron panel was the original automated metrics. And what happened was that, Jenova, carbon copied it later as a neutral Val and then later on bought out meta metrics.

At some point in the 2000s, I think. And so when you go, so there's, there's actually competing organic gas, acid mitochondrial testing even within the same company because originally it wasn't the same companies. So, this is a big picture overview of what it takes to analyze the mitochondria.

So we talked about the factory. When you're looking at a mitochondria test, you want to make sure that it's testing for the actual how well is the factory working mitochondrial function.

Understanding Mitochondria as the Cellu2019s Power Plant

Can you make the electricity, the neurotransmitter metabolites, meaning are you getting signals from the outside of your electricity needs for inflammation markers?

Because inflammation also can really affect and slow down and cause all sorts of problems within mitochondria. Free radical markers, detoxing, micro infections like each micro wall effects mitochondria, the fatty acids, you know, amino acids, the building blocks of the you know, acids are used to build the walls.

And, you know, and not just the fat amino acids are there to build the inside of the mitochondria. It's actually to run the electricity factory on the inside, etc., etc..

So there's a couple major panels out there. There's there's a, there's the O test by Great Plains, which there's the iron panel by Genova, there's the neutral Val by Genoma, there's a metabolomics by Genova, there's the new one

called omics.

Omics by diagnostics. Solution labs were most famous for the GI map test or stool tests. And I'm going to talk about comparing mostly neutral and iron panel.

And it will explain the other tests as well. And the primary reason quick question. Yeah. So organics is another test by Genova. Can you explain how that differs from the neutral or.

Yes. Yeah. So so the organics so there's there's checking for the organic acids of, of the mitochondria which is, is the factory itself spinning and making the electricity.

Then there's the iron panel which is that test plus the peripheral nutrients around to make sure the factory is working well. So the organics comprehensive profile is the urine portion where it's checking for the the primary function is the actual factory working and is the liver pass.

It is is checking the detox pathways. It's also checking there's a couple other metaphors I forgot to include. The mitochondria burns fat. It burns amino acids and it burns carbs.

And you need to bring these things to the factory. You need to bring raw materials, need to bring the oxygen. So that's why we have red blood cells, you know, bringing around the oxygen to bring it to oxygen, to burn the fire in the furnace, to make electricity.

But you need raw materials, fuel. And so there's you bring fatty acids, amino acids and carbohydrates, and there's three different each, each, one has a different trucker's union that requires to be paid in different things.

So the fatty acids truckers union requires B two carnitine glycine and magnesium. People don't know much about magnesium and glycine. They need to be paid.

And if they're not, they don't deliver the fat. Sorry, doesn't work like that. The amino acid truckers union is paid in B vitamins, mostly B6. And then the Carbohydrate Truckers union is paid in B vitamins.

Chromium lipoic acid, a couple other odds and ends. So I got I'm sorry, I just I have studied this test for a long time and studied with some of the best, and I just have a whole new eye opening awakening around this, just in that 30s that you talked about truckers unions.

Okay, carry on. Amazing. Thank you. It's, my, very apt metaphor, given what just happened in Canada, but that's a whole story. Anyway, my, So what's the.

There's different people can get smaller versions of a mitochondria test, just the urine where they're looking at. If the function of the mitochondria itself, then I would recommend they get the larger pan.

If instead they get the larger panel that's a foods, a serum or sometimes a blood spot of looking at, you know, like fatty acids, amino acids, heavy metals, minerals, other nutrients, inflammatory markers and so on.

So, the iron panel includes the organics comprehensive profile. It's it's nested underneath it. Okay. So, what why do I like the iron panel? One? It's the original, and, it's it's also the readout only the OMX, the the new one has a similar readout and that I've shown on this site, this slide, it's showing that the iron panel is red in statistical quintiles where that's really important.

They're much easier to read. And also it's important because you can see very clearly if there's any defects between one enzymatic step to the other. So if I have, it's it's a no, this is getting really into the weeds here for people who are the public and for the clinicians.

You know, this can also get into the weeds, but just looking this is a much easier way to read the the data in in a clear consistent quintile separation.

So quintiles means there's it's a bell curve. And the bell curve it contains 95% of the population. So from the bottom edge here on citrate to the just to the top edge is 95%.

So above this line is the top 2.5% from 97.5 to 100% of the population. The bottom is the bottom 2.5 to 0%. And everything else is a bell curve. And so the third quintile is kind of the very top part of that and everything.

The bell curve, you know, becomes that bell curve shape towards the edges. And this is really important visually because it's kind of it's you can be able to see that if there is a block from converting one thing into the next, and there's enzymes that are in between these steps typically, and that the enzymes, if the enzymes aren't working properly, you'll see a really huge difference between something will be high up here and then low down here.

That means there's not a there's not a deficiency in the one that's low. There's actually a block in the enzyme that converts the one thing to the next.

And those enzymes are usually like we described before. They require vitamins and minerals, in order to work properly. But you can't really see that on these really weird color coded floating bar thingies that you see on the new travail and all these other tests.

So it's only the iron panel on the OMX that has this really great readout. Yeah. Of that I love that readout. It's harder on the neutral. Really hard. I really dislike it a lot.

Now then there's the other thing is the creatinine level. And this is another thing that most people don't know. Oh, so is that the creatinine is a measurement of how how thick or diluted your urine is.

And if your urine is way to dilute that means that the the what you see on the labs are skewed. Or if it's too thick, it's also too skewed because these numbers in parts per million, parts per million of what it's it's divided by creating this, this kidney marker.

So if the marker is under 50 the creatinine level is under 50. Doctor Lord says himself, you got to drop all markers by a quintile. That's really important because if someone's reading all high but their screening is really low and that makes sense because it's divided by creatinine.

And if the lower the denominator, the higher the end result is and the higher the denominator. If it's over 350, then the more dilute, the smaller the end results are going to be I so I want to interject here.

This is so important. So this is something that you and I have learned because we've mentored with some of the best people. I mean Dan Kailash is taught by doctor Lord.

I mean to be to be mentored by doctor Lord is incredible. You and I could only hope, right. But at least to mentor with Kailash. Who? What? Who is, studying with doctor Lord right now.

But the story I want to say is I have actually had conversations with the lab before where they said, oh no, no, no, no, no, no, we account for the creatinine.

Just take the test for face value. And no that's not accurate. So a huge pearl right here for for those of you who are practitioners. And even if you're a consumer watching this, to know that your practitioner better account for a low creatinine and shift all the markers need to shift down.

And you read it completely differently so that they will distinguish. If you are working with a practitioner who actually understands that piece, you will get better results with your I'd rather.

I'd rather take the word of the guy who invented the test than reassurances from a lab company. Exactly. So, yeah. So this is this is, Doctor Kailash call this the most important number on the entire test?

Because it determines how you look at the entire test. Then there's normal elevations that are circumstantial. So,

for example, when we talked about the bell curve, and if it's above, if it's above the top line here, normally this this test was originally designed by Doctor Law to look for, genetic abnormalities in metabolic metabolism.

It didn't really have genetics testing back then. So if things were over to X, the upper limit, then that means there is an underlying error of metabolism that was genetically based.

There's a couple exceptions. Beta hydroxybutyrate being excessively high. You got to look for a keto diet if the here five hydroxy and all a pseudo acetate I believe is the scrambler.

It can be super high for on antidepressants or if you're on a really high dose of Saint John's wort. Also, I've seen lauric acid being kind of just super high.

And these are the coconut oil bulletproof coffee enthusiasts that are just taking way too much coconut oil that their system can handle. And this is why taking a very thorough health history when you're reviewing an organic acids test with someone is so vital, because these these markers can be influenced by what people are intaking, supplements, pharmaceuticals and food.

Absolutely. So what?

Overview of Major Mitochondria Lab Panels

Actually, I think what I wanted to, demonstrate here is that this is what the amino acids, the next section is looking at the, the amino acids. Now I'm going to show you a, when you look at, look for patterns.

So, so we're going to go into different sections of the, the iron panel and all these other tests have amino acids on them. So we can take learning from this panel and extrapolate the major big picture lessons over here.

So if the amino acid is low then it's and general just point and click like you just add the amino acid that's missing. If they're very high then you think of okay the trucker's union isn't happy.

They need B6 to deliver. And very rarely do I see people things down the middle perfectly. It does happen occasionally. But, you know, like I'm it's. Yeah. And then you've crossover.

So real quick just to break down what you just said. When you're looking at amino acids, if you see high levels on amino acids, then you know they need B vitamins.

If you see low levels on amino acids, then you know they probably need more amino acids. But if it's high, that means the amino acid isn't getting into the cell.

They need B vitamins, correct. You need you need B vitamins usually B6. It's easy. It's actually easy to read because pal, once you get these like easy asterisk okay.

It's because they get I mean the you're the cycle is a whole of a 30 minute conversation which we don't want to careen into, to too much. There's just so much to know.

But bear with me as we go through this. If I want to highlight something, it's because of my own journey. When I was going through this, it was like that moment like, oh, that's how what this means.

Okay, let's get you some B vitamins. Right. So there's some pearls here that we want to highlight. Yeah. And things like also like spinal alanine entire scene.

If people are having low mood like amino acids is one of the easiest things to help people with. Because if you give people free form amino acids, not collagen, not pea protein, not rice protein, you want to give them free form amino acids, because people's guts are generally a mess.

And the free form amino acids, they're basically these are these are the Lego blocks and your body, the whole point of digestion, of taking protein, whether it's a steak or collagen powder, powder, whatever it is, it breaks down these jumbled together pieces, Legos that are all stuck together as 20 different color, you know, Lego pieces.

The body in the bloodstream wants to break down all of those assembled Lego pieces into the individual Lego pieces. The individual Lego pieces now chewing stomach acid, stomach enzymes, pancreatic enzymes those all break down proteins to two.

And, at the smallest level, two and three amino acids that are stuck together like little Lego blocks stuck together. Your body still can't use those to build things in their individual, to ship, to send to the other cells, to be used.

In fact, those last two and three Chaldean tri peptides are 2 or 3 amino acids that are stuck together, like Lego sets. They're broken down in the cells that line the gut.

And if your guts the mess, it's leaky, it's inflamed, there's infections. If they're in the iron working like you can't, you can't, you can't absorb them.

And and those two and three amino acid blocks leak into the bloodstream. Your body interprets those as foreign invaders, and you can develop auto immune responses to that.

And your cells can't use them. So if your gut is damaged, how are you possibly supposed to absorb amino acids in order to one heal the gut and to make sure everything else in your body is repaired?

Working properly like your mitochondria? The answer is amino three form amino acid powder because they're already the individual Lego blocks. No digestion required.

Your gut can be thrashed and you can still absorb them because they literally just go straight in the bloodstream ready for use. Now is a massive revelation that I learned in studying the iron panel on mitochondria is that I almost never get protein powders anymore.

I give free form amino acids if people's guts are a mess. Yep. So if people are struggling, you know, giving people the correct free form amino acids, not just some broad blend, because you're going to need grams, not 300mg of piracy, you're going to need like grams of this and obviously don't if you're tyrosine solo work with underneath someone who's trained, don't just go out and grab a bag of grams attire.

Assume you know asterisk, asterisk, disclaimer, disclaimer, whatever. But I'm telling people like like amino acids is one of the most powerful sections on this entire bit.

Because if you find globally low, I mean, I mean, I have I've worked with this past week who had 15, 15 out of the 20 as first quintile or lower, a disaster, absolute disaster.

And that equates to disastrous mitochondrial function as well. So like that's foundational. You're in a hypo metabolic state at that point with that level of amino acids.

So you better fix that. Absolutely. So then we've got on the iron panel. We've also got a marker of homocysteine. Ideally we functionally want that below eight.

And you can look at the iron panels. Also really nice to find the other things that influence homocysteine all the nutrients that go into it. There's certain, minerals that are tested for potassium, low magnesium.

There's other markers that also check for the functional uses of magnesium. Erythrocyte magnesium is measures only a certain section of the magnesium pool in the body.

But there are other markers that that are used of the tri Karbala marker. That's that's on the organic acid section. And you can check there's other ways to look for magnesium globally.

The calcium one is confusing.

Reading the Organic Acids and Iron Panels

The calcium is not about high calcium. It's about membrane fluidity. And when I see this high I look at how are the fatty acids messed up. And so, the the fatty acids damaged in some meaningful way.

Then look at zinc and copper and you can look at ratios. Selenium I have seen people overdo the Brazil nuts. That's that's a thing that does happen. Yeah.

And then the checks for heavy metals. Now there's so many ways to check heavy metals. Toll blood is a window into recent exposure. In the past four months.

There's many other there's whole summits devoted to metals. This is not a metal talk. This is really looking at recent exposure in the past four months.

Because why four months? Because red blood cells or whole blood takes four months to turn over. And that's that's what we're looking at while we're on this topic.

Just if you could sidebar real quick. So this is looking at metals, recent metal exposure. When we see when we do urine tests what's the time window for urine testing.

My understanding of the urine testing. It's what you're getting rid of daily through the kidneys. And there's different types of urine tests. There's like a 24 hour collection.

There's the spot test, and then there's the quote challenge test where the challenge where you basically you take a molecule, whether it's DMSO or a bunch of glue to on or whatever, your chemist.

Yeah. Or suppository, who knows. Of stuff. It's you're basically they're pulling metals out of the tissues and then you're catching in the urine. What is in the what was in the tissues versus what's just on a normal background level?

Detoxing. Yeah. And there's a whole other conversation. Yeah, totally. And what I just want to make sure practitioners and consumers know when they're watching this is that it's really hard to test for heavy metals.

Your body sequesters those metals deep away in your tissues to get it away from your vital organs, your brain, because they're so damaging. And so you can be full of metals and tests completely normal because your body isn't releasing it.

It's too dangerous, too. So that's a whole nother thing. And by the way, one of the things, you know, we both learned, and so Doctor Kayla is like, just because someone has really high heavy metals doesn't mean you go on a detox because your mitochondria, your amino acids, your fatty acids, your adrenals, your gut isn't ready to handle it.

So if you see high metals, it doesn't mean you careen into a heavy metal detox right away. You've got to make sure you're healthy enough to withstand the extraction of heavy metals, because you can.

You can be in a world of hurt. If you extract metals too quickly, you're not ready for it. You better work with a practitioner who does foundational work.

I mean, you don't want to even start doing that kind of heavy detox work for at least a month or two until you're ready to tolerate it. So yeah, yeah, I do.

I do like metal testing as much as possible until I know they can handle it. Yep, yep. Okay, good. This is great. So what else you got. So this is an example also of not having to do a heavy metal detox, but just working with a client

that had arsenic and mercury.

And all I did was attend to the other matters of the mitochondria. And you can see his heavy metal levels went down just without having to do a detox, you know, and his skin.

And for like all these subjective things got so much better. And I'll show you the skin stuff in a minute. So then we've got fat soluble vitamins and, CoQ10 being high is usually from supplementation or hypothyroidism.

And, then you got lipid peroxides. This one's an important one. Because if this this is telling you how damaged your fragile fats are, I have an entire separate video, where I describe just the fatty acid portion of the of the iron panel because it's so complicated that if you've got low, low fatty acids, but even normal or high lipid peroxides, I mean, any fragile fat, fish oils, flax oil, hemp oil, you put in your body is being nuked.

It's being it's being crisped when it hits your body. I've pulled people off the fish oil off of flax oil for several months while I load them up with fat soluble antioxidants that they need, because if they take fish oil in a damaged state where their lipid peroxides are high relative to theirs, you see how this is like globally, you know, low, except for these three here.

Like you're you're going to crisp all of those fragile and expensive fatty acids. You got to wait until your body's in a basic deep fryer, not just right.

And by deep frying them you're causing free radical damage in the body. I mean, not only are you not getting the benefit of it, you're actually causing harm, right?

The other benefit of the iron panels actually gives you the gross level of the fatty acids, because the other the unfortunately, the other tests only give you ratios.

So you may have a, you may have a great ratio of, you know, glide to this or whatever, but you don't even realize that you're actually globally deficient.

That's the other problem with the other mitochondria test is they don't give you these actual numbers. Now this is an example here of an enzyme break between LR and GLA is what's called delta 60 saturation or D6 d.

And this requires B2, B3, B6, zinc, magnesium and vitamin C. Now doctor Lord said if there's a greater than two quintile difference and this is 1234 quintile difference, the mistake would be to give someone GLA.

Instead, you want to fix the enzyme that converts Le into garlic. And so you identify through the rest of the test. Is it B236 vitamin C zinc or magnesium.

Everybody. See I think I said already so this is now I had this. And then on my next iron panel because I corrected the enzyme, they were perfectly, overlapped above each other.

It was an enzyme issue, not a GLA deficiency. And you just take that conceptually. Now, I also made a a complicated chart, you know, to understand all the enzymes and everything.

This is my nerd is showing, I know. Yeah, this is good stuff. This is super shiny. Yes, but this is what's needed to actually analyze the test. Yeah. Walk us out. How does that work?

Look at that. Let's look at that real quick okay. So here we have there's there's common enzymes that are shared across like this column here there's omega threes omega sixes omega nines and Omega sevens.

Okay. Now there is visual. You read it from top to bottom in the on the line. So the omega threes. There's no need for a delta 90 saturation enzyme. That means iron. That's only in the omega nines in the omega seven.

So if there's a block and there's like rules here in the bottom right here. So if so we start here on the F of omega

threes. Alpha is in the first quintile right here.

And then we come down. And then there's all these other steps that the test doesn't check for. Then we come here to EPA, which is in the fourth quintile.

So usually alpha has to convert it to EPA. So how is it that you have something super low then is something super high. And this in this case is supplementation.

So they're supplementing with with EPA, DHEA etc.. And then we come over here and we the next column omega six. And we have LA. And then we have the enzyme this this delta 60 saturates which converts LA into GLA.

Now this is in the fifth quintile. Now it's in the first quintile. That means there's an enzyme break. That's what I was just describing before. And the enzyme required the fix.

The fix is right here right B2 B3 B6, magnesium, zinc etc. which you'll see so so real quick what you will see on the I am Pam. So what I want to get to here is so I don't want to scare practitioners away from like, oh my gosh, I'm going to have to study this for five years or four years like doctor shaded before I can do this.

No, because the test actually gives you the answers. So you'll go through the iron panel. You'll see that they have these deficiencies and you support that. Yes.

You don't have to know it at this. So you don't have to know this level of understanding that you have you can actually successfully support people. If you go to the big picture of the test.

Absolutely. Okay. And and just know like like it's going to be a journey. Like it's going to take some time to learn this, but it's totally worth it because at the root of most people's issues is a major mitochondrial component.

Yes. And we've got. Yeah. Then we've got the other fatty acids.

Creatinine, Amino Acids, and Nutrient Patterns

This is, you know, the coconut oil enthusiast, usually too much bulletproof coffee, chains. You know, I just this is a pretty straightforward is there a B12 carnitine dysbiosis or biotin issue?

And this one's really great. The trans fat. If someone's got a high marker here, you hold your client to account. So you are sneaking in trans fats. Yes you are.

You can actually tell if people are cheating with this test. And the other thing you can do is you can acknowledge people who aren't. I love it when I do this with people.

I say, I can tell how hard you're working on your food because your trans fats are low. Yeah, yeah. So, then we've got, this is an example of someone who's catastrophically low in fatty acids across the board, just catastrophically low, showed high fats in the stool.

You can see that they're not absorbing. And then, then we come to the, actual mitochondria portion, like the mitochondria itself. And there's three ways to look at this.

We're, Well, we're just finishing up, like, because we're kind of in the homestretch here you want to look for is it globally high? Is it globally low, or is it mostly in the middle with a couple odds and ends and either side?

That's the main thing. So if it's high like this person, their engine is run. Their mitochondrial engine their mitochondrial factory is running hot. It's burning fast. It needs more nutrients.

It needs to keep things going because it's running, running, running, running, running isn't good. Running hot isn't a good thing. It's not good. It's so.

It's not as bad as if it were globally low. And now this is a new phenomenon. If if everything was globally low, which it isn't in this case, that's called mitochondrial retraction.

It's a new phenomenon. In the past decade or so, the doctor Lord himself came out of retirement for research. And when people think, oh, this is high, oh, these are really bad.

It's like, no, it's worse when it's all low. Here's why. The this portion of the test when checking the mitochondria. This is a urine function. This is the equivalent of an emissions test of a car.

This is looking at what is what has been used. You've put in oil. You've put in gas. What's in the blood is the equivalent of oil and gas. The urine is what's come out the other end.

So if you turn on a car and you've got this massive plumes of smoke coming out, and it's really but that's, that's the high pattern, that means the end is totally working.

You need more nutrients. And like, it's just it's it's overheating. It's inefficient. It's inefficient and burning dirty, burning dirty. Now here's the problem. You turn on a car and barely anything come like eerily low emissions come out like that's scary.

That means half of your engine has melted and is not even running. That's way worse. That means you have to rebuild the engine because it's not even working strong enough to even make emissions.

That's why globally low is worse than globally high. You'd rather have a really hot high high running in a engine that's just blowing through nutrients than an engine that's half melted right.

Because that leads to more chronic disease and illness. And, yeah. Right. Imagine if half your electricity factory in a city just stopped working. But your emissions would be low.

That'd be great. But they're not getting electricity. You're not. You're not making this up so real quick when you see it. So let's pretend that this red box you have here was all the way to the left.

Like this was really bad. What do you do? So I mean, massively different protocol. So it's slightly different protocol. So to, to rebuild a mitochondria, a rebuild of an engine is different than feeding an engine.

Feeding an engine is I mean, it's even listed here, you know, carnitine and B two and B vitamins, lipoic acid, Co Q10, amino acids, magnesium. That's great.

But to rebuild you need to add in tryptophan you need to add in more amino acids like a whole bunch, like a bolus like 7 to 10g or so. But again, you get there's some nuance there.

So you gotta work with a clinician who knows what they're doing. You add in a bunch more amino acids, you add in PQ, which is a thing that patches up the walls of the mitochondria, tryptophan, because that's the rate limiting step of all protein synthesis except for college information.

And you generally just need more of the nutrients that a mitochondria would regularly need. So it's all the regular stuff, plus extra amino acids, extra L tryptophan, extra peaks. You, extra, some extra magnesium and, Yeah, that that's the core of it.

Yeah. And, you know, I've seen that a few times in my, in my practice, I've had people. It's just like I like to think of as flatlined mitochondria. Right.

They're not they're just laying there doing nothing. They, they can't even make energy. And yeah. So this is a break in this down because these are the people that whose adrenal programs fail.

And if they have low mitochondria, the low mitochondria, people, they are the ones who if they also have adrenal

issues and they do this great adrenal program, those are the people with the adrenal systems that fail their treatment of their adrenal issues, because it's actually the mitochondria need to be attended to for the adrenal stuff to actually work.

That's why I love to run an, mitochondria test alongside an adrenal test to see can this adrenal protocol even support and, you know, but people who, you know, when you're doing that, I mean, you're you're you're consumers, your customers, they got to be bought in.

This is not cheap to do all this stuff. A lot of times, I mean, just give me the inexpensive adrenal test, right. But you won't get the whole picture.

You can do that. You can do the piecemeal kind of, it sounds off of the serial testing monogamy, where you this this serial where you two one test. And if that doesn't work out, you go to the next test and you go to the next test.

The real testing. Monogamy. Okay. It's it's it's an awful metaphor, but it's pretty hilarious. Yeah. So it's. Yeah, it's to give the other metaphor of doing all the tests at once is even worse sounding, so won't even go there. Yeah.

So I'm, I'm tracking. I'm tracking you. So I thank you. I think most people are trying to suppress either a sigh or a smirk, either through works. So, ideally you work with a practitioner that looks at gut mitochondria and for moans like adrenals at a minimum and a minimum.

So the way people can look at with testing is like, it can be where you can, even if people have if people aren't able to prioritize resources towards, like all of the tests, you can you can start with a meaningful foundation, just the urine portion of the mitochondria, the organic acids, you know, a, stool test and the adrenals.

That's foundation. Then you can layer if you can do more, you can layer instead of just your organic acids. You do an iron pan instead of just a stool test.

You could do a stool. Plus, say like a breath test for Sibo or maybe some food allergies. And instead of just an adrenal, you can do so like a Dutch test where it's adrenals plus sex hormones.

So there's where there's ways to actually create a real foundation at a lower tier of investment and still get a massive amount of information. And there's ways to layer on top while keeping with that same triumvirate of mitochondria, gut hormones.

Yes. And and always what I say when I do this, I have clients that I work with where we run this whole group of tests. Once we get all that information, this is a 6 to 12 month process to repair that.

I can't you can't physically take enough supplements to support every single problem we see. So you got to work with someone who can do it in the right order.

So let's fix this thing first. And then once that's feeling better, that's layer here because you can't do it all at once. You just can't know what it's good to see the whole picture, to know where to start.

Yeah I'm typically typically when I work with people they usually have some severe gut issues.

Fatty Acids, Heavy Metals, and Enzyme Blocks

It's like the first six months is actually split up into three two month sections where you deal with one in certain infections you got to deal with in a certain order, like you do with infection number one, plus mitochondrial stuff and whatever adrenal stuff you can sneak in there.

And then the next month is this, you know, similar mitochondrial, some low level moderate conjugal support or, or the highest priority stuff in the mitochondria testing and then the next infection and then the next infection.

Cetera. Then the next six, next month, 7 to 12 is almost all like straight up nutritional replenishment, mitochondrial adrenal rebuilding. You said some gut.

You said something really important. I just want to highlight it. You said in the beginning with this severe gut stuff, you sneak in mitochondrial support. And I want to highlight that.

You just said that because this is so critical, and it's the piece that's left out of a lot of functional protocols where people like, we're just going to blast your gut.

We're just going to kill some stuff and give you, you know, it's part you got it. It takes energy to heal the body and to remove infections and to support the immune system and to reduce inflammation.

So you must sneak in mitochondria support, which is of course, you and I know that, but not a lot of practitioners do. So if you're watching this right now, make sure that you are getting that mitochondria support in there.

Even when it does thing it's mitochondria support. Plus all the of missing amino acids. It's actually one of the best things you could do to help someone's gut repair is to identify all the deficient amino acids and replenish that along with whatever your, you know, boilerplate amount of glutamine that it is, because you need the amino acids to rebuild the cells of the gut lining.

So I it's this is this is where iron panel is synergistic with gut testing, just like adrenals are synergistic. We got testing because they control the secretary.

I g anybody you know immune portion you know all there's there's all sorts of stuff crossover. So we this is actually the miracle this this so right here this fatty acid metabolism right here.

This is the truckers union for the fats. Carnitine B2 glycine and magnesium should be on this. Also a glycine is specifically for the ethanol innate portion down there for the longer chain fatty acids.

Then you've got the carbohydrate truckers union. And down here which is the vitamin markers. This is technically it should be amino acid catabolism. This should have been renamed this is the amino acid truckers union down here.

And then this is the actual inside the factory. What's going on? Right here? So I know we're running out of time. Let me just quickly blast through all the rest of it.

These are the neurotransmitters. If people are not feeling well, this is one of the most valuable parts of this test is looking at, if you are, neurotransmitters aren't working well, like tyrosine for mental and emotional weight, you know, tryptophan, you know, down here for the, for this one.

Also B6 antioxidants. You there's also a secret copper metabolism issue you can find if, the homo vanilla markers, at least two quintiles above the normal Mandalay.

If people want to, you know, they can pause on the screen on the video and kind of study that a bit more. Then we've got brain inflammation markers, free radical markers.

Then we have the liver detox markers. There's three markers here just for glutathione alone. Wait, let's back up one second because okay, we can't we just have to take more time on this.

So, the brain inflammation is really important. You know, when, when you have people that are, you know, their serotonin is off, their dopamine is off, it's going to be really hard for them to actually carry through the protocols that you are recommending.

So you better look at this piece and support so that they can actually execute on that kind of emotional level. Right? Yeah. And the thing is, is that if there's if there's an amino, usually there's an amino acid deficiency when these are really low.

And so with, with supplying the amino acids up above, you're going to actually help people's moods. Just just as a matter of course. And then if you identify if there's also B6 antioxidant need as well, you're going to be able to support the neurotransmitters and like you, you know, like what we also learn when we study Doctor Ellis, just like the first few months, are very critical because we want to help people feel better as quickly as possible, not resolve all the things.

Yeah, because they're not. We want to make them feel better. So they get inspired to continue on. And the results. What's your thought about like if you're if your clients don't have the money to do this extra testing, what's your thought about throwing math aminos in to people's protocols?

Just doing a really good health history, suspecting you probably got some amino acid deficiencies. Are we doing any harm by saying take some. You know, Mapp amino is a couple times a day.

So it depends on the dosage you're giving. And if they have a history of, recent cancer. Because if you give like ten grams of I mean, this is the debate within this community is that when you give a one of the reasons, you give 7 to 10g of amino acids in one bolus in one shot when they have all globally low mitochondria is because that triggers the mTOR, function of the body.

To start rebuilding stuff rapidly, you build up mitochondria. So there's a debate on, well, if someone's concerned about cancers, and you stimulate the more pathway that that could then trigger, proliferation of cells, you don't want to proliferate.

And then the other side of the irony is, well, how can the immune system and the entire mitochondrial system work properly in order to combat cancer, even work without having sufficient amino acids?

So it's a it's this kind of chicken egg thing. And so the solution that has been discussed and again, people listening to this, you got to work with clinicians is like, okay, if they have that concern, about growing tissues that don't want to be extra grown.

You don't give the bolus of 7 to 10g at a time. You give smaller amounts throughout the day because it's the giant bolus, the giant one hit of amino acids that will spike the, tau.

So you can you can you can instead get dripping in amino acids to help remove deficiencies. And now aside from that concern, free form amino acids is, very, very useful.

The only problem as a general, as a general thing to do, I mean, there's whole formulas of, you know, like the nine base, you know, essential amino acid blend or whatever.

And they're usually blended according to the average amount of amino acids in the human body, you know, like 1% tryptophan and, you know, x percent leucine or whatever it might be.

And the only issue that I have with that is that if they are in, if they're not taking enough B vitamins and there's and that they're having problems with B6, then they're not going to have enough and they're just throwing extra amino acids into the bloodstream that are just getting kind of stuck circulating.

Yeah. Because remember the truckers union for amino acids. Yeah. But mostly B six in a couple other, you know, little currencies on the side of other B vitamins. And so, you know, this is where and this is where nonspecific functional medicine comes in.

This is where just people are selling their off the shelf mitochondrial kits, just like they're selling off the shelf detox kits, or they're off the shelf adrenal kits.

People have been helped meaningfully by not doing testing.

Mitochondrial Function, Rebuilding, and Gut Support

But there comes a point where people either get, unpredictable or plateaued or results and they get stuck, and then they go into this thing where they just continue on the protocol harder, but they're not getting what they need, and then they get frustrated.

And that's where testing really shines. Yeah, I feel you avoid that situation to begin with, because then you can just get specific all the way. I personally think that investing and testing is going to save you money in the long term, not the short term, but in the long term, because then you actually know what supplements and dietary changes and lifestyle changes you might actually need as opposed to this, you know, chasing magic bullets and shiny object syndrome in the supplement world.

Totally, totally. Okay. Thank you for going on that sidebar. I know this is going longer than we thought, but I think this is too important to cut the short.

So, just apologize in advance for everybody who said I would beat this be 30 minutes, but I'm not stopping, so you can always, always split into two parts if you want.

That's another option. But, the other things to put too, like look, shiny doctor shave speaking is the best interview ever. We give them all this extra stuff anyway.

So what's that next? Yeah. So where was the next slide? So the next thing is, so we talked to this brain inflammation, free radicals. Okay. Then we come to liver and some time here because that sulfate level is so important.

And I think that let me, I'm going to show you, I'm going to crop in here an additional, an additional looking one here. So I get a bad one. I literally just crop.

I'm just going to crop in this one right here. All right. We'll just start with start with that one. All right. So Doctor Lawton and he updated his book, his magnum opus last year.

And it's this fifth 1400 page text on the on just all of his research. He's he's pointed out six different patterns of glutathione on collapsed. And the first one is when six there's six of them.

So the first one is where you see alpha hydroxy butyrate shoot high alone. And then over the different stages you see pyro, glutamine shoot higher and then sulfates shoot up and then it goes low.

And then like this goes below it. And then the worst one is when sulfate is low and your lord call this marker. Aside from the creatinine, the most important clinical marker on the test, where if you have low sulfate, that means that you are lacking the most important component that is there to make sure that you are actually able to generate glutathione.

And I'll show you, and I've heard that I've heard Doctor Kelly's talk about it as like full system collapse, collapse bad. So, so just so as you're watching, when I'm looking at these tests, the first thing I do is I look at the created and the second thing I do is I look at the sulfate and I'm sure you do the same thing, and then you go back and you look at everything else.

Correct. So if the sulfate is low, that's super bad. And and there's one there's if that means so good. If iron is used as a heavy metal shoe, later as a free radical scavenger, as a as things to help detox like hormones, like estrogen and all the rest of it.

So there's doctor, the word lithium is so important with three separate markers for glutathione on and it's updated book. He talks about the different stages of good as iron collapse, measured by the different permutations of, of of these markers here.

Now, one thing I want to point out, pyro glutamate is inaccurate in only one specific population, pyro glutamate. So people may ask, well, if I test this from day to day, is it going to be the same?

What about after 30 days or this week, doctor Lord tested that back in the 70s? Or had everyone in his office in the clinic every other day do an organic, do a test, and he looked for the ones that were outside a quintile difference, and the only one that was wildly variable was in menstruating women power.

Glutamate. So if you have a client that's a menstruating female, ignore the pyro glutamate marker because it's just all over the place in the course of the month.

I have never heard Dan Taylor say that before. That is new to the recent I think. I think that was in the other three years I was in the mentorship. Oh my gosh, that's amazing.

I that is a pearl I'm taking with me from this lecture today. So if you so in menstrual now it works fine for premenstrual and menopausal women and for all men.

So so that's that's really important. Is that little pill glutamate is the only marker while they're menstruating. Or just a woman of menstruating age in menstruate if they are having active menstrual motion.

It's not it's not while it's not on the day of menstruation. That's not we're talking about. It's the fact that there in the ovulatory monthly cycle. Yep. That they are they are they are ovulating.

So they're ovulating more prior to me. Okay. So that pretty much we're ignoring that from teenager through menopause. Right. Okay. So authority is telling you how well you a cycle is urea is important because it's it's basically it's how you get rid of ammonia.

And if ammonia builds up in the mitochondria it shuts down the mitochondria. I've had people with terrible, fatigue and their urea cycle back in the amino acids was all messed up.

I gave them products to support the amino acid urea cycle. They said they smelled their urine, smelled like ammonia for a week. And there and huge amount of energy came back.

And you better be thinking about gut health with this, because where the heck is all that ammonia coming from, right? Correct. Methyl Hypocrite is checking global toxic exposure, and gluconate is checking medication detox.

And you see if people with very high glucose rate, they're not able to detox their medications. Well, yeah. The very we work with a lot of people on major prescriptions and prescription drugs and yes, it's a problem.

Then we've got the very last one, which is the microbiome. This one's, this one is there's a couple gems on here. Not that many, but, if, if benzo eight is high, but hip rate is lower than normal, then you look it's a glycine issue.

If, if pepper rate is high and benzene is low, it's a dysbiosis issue. If both are high then it could be either both a glycine issue and also a dysbiosis issue.

I really look at the d lactate. If there's a dysbiosis causing some that it's creating a toxic buildup of D lactate affects the brain. And driving a tall as a yeast and focal marker, this is actually really valuable because in a lot of gut tests, I'll not all gut tests are optimized to find yeast based on the preservatives used when they ship.

The gut tests over to the lab. So sometimes you have to rely on this marker to see if they actually have a systemic yeast infection, because a lot of the stool tests aren't really optimized for that.

Before you do this, before you leave this section, what do you say about the the, digestion markers that are here, hydrochloric acid. So, so the when I look here at the you talking about the, the, the funnel acetates and all that, the funnels.

Yeah. Like, do you use this to kind of say, well, maybe I want to do a botanical challenge on somebody. Do you ever use this to kind of say, well, maybe you need some digestive support?

I honestly, I, I never run in an iron panel without doing a gut test, so I, I lean on the gut test instead of, instead of this when I look at someone's digestion.

I mean, yes, you can infer if these numbers are really wonky that their digestion is generally off, but I, I personally, I just lean on the gut, test it, for that.

I'd say that tri carboxylate is also an important one. If this is high, that means they have a meaningful magnesium deficiency as well.

Neurotransmitters, Detox Markers, Thyroid, and Genetics

There's, there's I can say that again because it trips people up if it's high, high magnesium deficiency magnesium, it doesn't mean you have too much magnesium.

It's that you need deficiency because you need magnesium to to function to stop the build up of this thing. So if you don't have the magnesium, this thing builds up and that's, that's the indirect marker.

One thing also the cluster marker, you have to ignore doctor Lord, back when he designed this test, they thought it was only all cluster was bad. But now there's, like, what, 2000 different subspecies of cluster radius?

A lot most of them are commensal. So he said ignore whatever this is on marker 45. Just ignore it and run a separate, you know, gut test, etc.. And don't don't check a urine marker for cluster to check stool markers and so on.

Perfect. So there's that. And then just to round everything out, mitochondria, if someone has a thyroid issue, they must check for mitochondria because the mitochondria is the business end of the thyroid.

T4 is the four wheel car that leaves the thyroid and gets to the mitochondria and opens the door to let the T3 out, which is the engineer which turns on the dials and turns up and down the mitochondria.

That's the connection. Basal metabolic rate literally, is how much protein, fats and carbs you burn in the mitochondria. So people who have the appearance of hypothyroidism but normal thyroid markers check mitochondria because you can send all the engineers in the world to flip some dials.

But if the is busted, then no engineer, no matter how many times they toggle the switch, is going to fix it. So I just want to point this out because there's an epidemic of thyroid concerns out there and they're ignoring the there's there's it's not a bad but there's not our full appreciation of how important mitochondria is to thyroid.

I mentioned these other things. Estrogen can suppress thyroid. You know, adrenals can suppress the iron can affect thyroid. And plus the mitochondria test tells you are you missing vitamin A, vitamin D, D vitamins, selenium, zinc and tyrosine and arginine, which is all required for thyroid function.

So please bundle mitochondria testing with any thyroid testing. Lastly, there's genetics. I'm not going to mention any labs, I'm just mentioning that there's certain genes to look for when you're for mitochondria, specifically the three main genes that break down that are the and make the enzymes to break down.

So to quench the free radicals, the sparks that are made from burning proteins, fats and carbs in the mitochondria and inside GG, you're going to find peroxides and catalase.

The most important is mansard, because it's the one that starts the whole process. The body is amazing. It can take two free radicals, convert it through an enzyme into hydrogen peroxide, and then it takes two hydrogen peroxides and then converts it into oxygen and water.

Wow. The body takes free radicals and then makes it into oxygen and water. That right? Your body makes its own water, everybody. Yeah, it's it's amazing.

And if you're like me and have a red dot here and a red dot here, I struggle with free radicals because I have problems that the enzyme my enzymes, my genes don't make sufficient enzymes.

I to do lifestyle things to improve the expression of those genes to support my mitochondria. So genetics testing a whole other set of topics for mitochondria.

So those are the tests that people should be looking out for when it comes to mitochondria. If people want to learn more about me, I've got plenty of three, free ebooks, one on the ten pillars of health and goes into functional testing more two books on genetics. And, and you can go to my website if people want to work with me directly.

At the time of this recording, I still chat with people for a free 15 minute consult if they feel like you resonate with me and you like me because it's good for you.

If you like my sense of humor and the way that I explain things. So that's that's a wrap. And you have any less questions or thoughts or anything for me I can help you with?

Yeah. This is this has been really, really incredible. This is super helpful. I think that it can be daunting, when you're looking at, you know, an organic acids test, whether it's the full ion panel neutral or just the, just the urine portion.

And a lot of times you look at it and say, I have no idea. It doesn't have to be that hard. You don't have to go as deep. I mean, clearly you love this stuff like you are a scientist.

You are an academic. I am not an academic, I am not. And I have a basic understanding of this test. And I can get people better with the understanding that I have of the test.

And so if I can do it, anybody can do it. That's what I'm saying. I can do it. Anybody I know I going to push back. You are a scientist. You're the ones.

A lot of pinned butterflies in the background. You. I'm not a scientist, so I don't know. Yeah, they're pretty special to me, but, But, no, I mean, my superpower is really, helping people get from point A to point B by simplifying things and making it easy.

I don't personally get in the weeds of, you know, the Scrabble word, the Scrabble words on the on the on panel. I love how you call it that. So it's been so helpful.

I know that if you if you're a consumer of health care and you stuck with us to the end here, now you know what to ask your practitioner for, right? And you know when when you're looking at this test, if they don't have that basic, you know, if they're not looking at the creatinine, if they're not looking at the sulfate level, if they're not helping, you see that you might need some B vitamins, you might need some amino acids to solve this problem.

Then, you know, probably talk to another practitioner. And if you're a practitioner watching this now, you know how actually not too hard it is to to tune, you know, understand this test.

Yeah. It's it's the basic concepts are consistent across all the mitochondria tests. It's a sit. It's a factory in a city. And you're testing all the parts that make the factory work that feed into the factory, all the ingredients and all the ways the factory can get damaged.

And that's what the testing is doing. And then it's a matter of, are you picking a test that actually gives you clear readouts that are easier to interpret and to find all the hidden things within each test.

So identify the key nutrient efficiencies and excesses in there. And I so I love the iron panel and I love the work that the doctor Lord has put together.

And that was transmitted through Doctor Kayla. Sean. So both of us. Yeah. And you took it way further than I did. So thank you. You you're it's so good.

It's so good. It's been wonderful. Thank you so much for being here and sharing your wisdom and making it fun and easy to understand. It's been great.

Thank you. I really I'm so grateful to you and all the other summit leaders out there, because it's summits like this that truly empower both practitioners and the lay public, because we need to, you know, we need to share.

We need to make this, simplify this, make it easy, understand and demystify it and not make it so damn intimidating. It's it's it's this is this is a winnable lab.

Testing is winnable. And it's it's just just getting the right understanding of how it all works and getting the right test. Perfect. Thank you so much. Do you take good care, Sam?

Thank you. Laura I know.