The Brain-Immune-Gut Axis And How It Relies On Your Mitochondrial Function Transcript

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Introduction to the Brain-Gut-Mitochondria Connection

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

And today, I have a very special guest for you, Doctor Peter Khan. Hi, doctor Khan, welcome to the summit. Thank you so much for having me. Laura. Yeah, I'm so excited.

You know, we've collaborated before years ago. You are the brain gut immune guy. We're going to talk all about brain, gut and mitochondria today. You support your clients with chronic conditions by merging functional neurology and functional medicine, which puts you in a very unique space.

Your board certified in integrative medicine, functional medicine, board certified chiropractic neurologist, and you're the creator of neuro metabolic integration.

And basically that's a science based, virtual online coaching program. And it identifies the root cause of autoimmune and other chronic conditions. Do I have that right?

Absolutely. Yeah. Okay. Great. Now you've worked with a lot of people, well over 5000, clients. And you really are an expert in helping people suffer who suffer from chronic conditions.

So we're going to get in today about mitochondria, brain, immune, gut. It's all connected. You can't ignore one thing. If you're want to heal your body and boost your energy up and fix your health, you really have to dig in here.

I think this may be one of the most important talks, on this entire summit. So I really want to thank you for being here and to share your expertise. As always, a pleasure speaking with you, Laura.

And, I love to contribute. Okay. So should we jump right in? You you know, I want to know really quickly how did you end up, you know, being a neurologist specializing in functional medicine, because that's a really unique thing, because you come from the Western world.

So how did that happen? Yeah, I actually I come from Taiwan initially, in a really steeped in eastern medicine philosophy. Right. My, my father growing up, when I grew up, my father was always like, hey, eat this because it's good for your eyes and eat. This is good for your liver.

You know, that's kind of how Chinese medicine works, right? You know, food is a diet medicine. And then, when I went into, you know, graduate school, chiropractic school.

So, my interest was primarily, you know, helping people with, you know, sports injuries and so forth. And then, you know, as my father and my son gotten sick and there's a it's kind of a story in there.

I had to figure out how to help them. So that's kind of how it got me into looking at natural ways and nutrition and supplementation to help them to improve their health and and to overcome certain health conditions.

And, so my practice, you know, I've always been very interested in brain because the brain is how you experience your life, right? We experience our life through our brain, right?

The ability to to move and our ability to see, our ability to experience emotion. It's all through brain. So brain function is such important part, and it kind of has its finger into almost every other area. People don't think so.

But your brain touches the immune system and it impacts immune system. The brain impacts the gut.

How Functional Medicine Led to the BIG Framework

The brain impacts hormones. The brain impacts a lot of different areas of the body. So by understanding brain, it really helped me to be able to help a lot more people.

And when I started marrying, in functional neurology, along with functional medicine, that really kind of put a lot of things together, because really, the there's this brain of your gut connection and that, you know, your brain function is hugely tied into metabolic, right, blood sugar perfusion, which we want to talk about today, which contribute to mitochondrial function.

So really, I think my number one purpose now is really to show people how big this system is and how to really appreciate it for what it is, instead of trying to go for like, oh, you know, a magic pill that I just, you know, treat one symptom.

I wanted people to see the big connection. Yeah. This is this is so critical. So you mentioned, you know, there's a connection with gut. There's a connection with the immune system.

There's a connection with brain. So we're going to dig into that. Can you talk a bit about the root cause of mitochondrial dysfunction. Can we start there.

Yeah. And I think mitochondrial dysfunction I see it as a as a symptom. I see it as a byproduct of other things going wrong. Right. Mitochondria is that cellular organelle that's in every, you know, cell in your body that produces ATP, that allows you to survive, allows that cell's survival, in your brain.

In fact, you have more mitochondria per neuron than you have, you know, as far as concentration and density of mitochondria in other cells. So the brain is very sensitive to mitochondrial dysfunction because brain is very, energy, dependent.

Okay. And so as far as the, you know, the brain you got connection goes, we want to understand how they impact the mitochondria. So understanding the mitochondria is a symptom or the end result of something going wrong.

I see mitochondria dysfunction resulting in primarily problems with fuel delivery, because for the mitochondria to run, it requires some strict you need energy source for the mitochondria to produce energy.

So mitochondria is the engine. But you got to put the gas in the engine for it to produce power. So I see fuel delivery problem is one of the primary driver of my mitochondria dysfunction.

And then on the other hand I also see inflammation as a another driver. Mitochondria dysfunction. Because mitochondria can easily be damaged and decoupled in a literature that's what is called they get decoupled.

Literally they break apart when they are hit with inflammation. So then that also impacts mitochondrial function. Let me ask you a question because inflammation is a huge problem.

Can you talk about how common inflammation is? Because I think people not I'm sure they have inflammation. Yeah. I mean, I think it's a really important topic inside.

Just couple of month ago, I literally just had a big immunity masterclass, a brand new national for just talking about immune function. And I had a big section on inflammation.

Let's define inflammation first. Okay? I think people just think, oh, inflammation is bad, right? Yeah, it is bad. But on a cellular level, what is inflammation?

And I think people think of inflammation as, you know, associated with the four cardinal signs of inflammation.

Right? Done. Redness, swelling, heat and pain.

Those are signs of inflammation. But what's causing those signs of inflammation to present. So at the end of the day, inflammation is your immune system trying to get rid of some type of pathogen.

Because that's the immune system job. Your immune system is there to protect you from external environment, specifically pathogens. So your immune system have these specific type of white blood cells such as neutrophils and macrophages and dendritic cells.

And these are phagocytes where they'll go engulf pathogens. That's the whole entire job is to find pathogens that's going to kill you and kill it before it kills you.

And in the process engulfing these pathogen, they spill enzymes and lysosomes, a granules that are contained with these white blood cells. So basically these white blocks are not only in golf.

They also digest these pathogen. In the process of doing that they can spill these enzymes. But these enzymes are really degrading. So in the process digesting the pathogen it may also digest your own tissue.

Root Causes of Mitochondrial Dysfunction

So you get tissue damage as a result of that you get some cellular debris that forms. And really at the end of the day that's inflammation. So inflammation on good or bad because it serves the purpose right.

It's there to kill pathogens. But then you can also get collateral damage if it hangs on too long. A lot of this problem with inflammation swings all the way to one side, but the pendulum doesn't swing back to homeostasis.

So just stuck in chronic inflammation. And that's where you get this. This not only tissue damage, but it starts to throw off many other things in the brain.

You need gut axis. So you start to get leaky gut. You start to get chronic inflammation which may suppress immune function. So you can't get rid of infection.

You may get brain inflammation that can lead to neural inflammation, which leading to brain fog, short term memory issue, even degenerative condition.

So inflammation is very common. Yeah. One more thing I want to highlight because you're touching on chronic infection. And you know people think of infection being something you notice like you have a fever and you don't feel good.

And maybe there's pain in there. But what we're dealing with are chronic silent infections by bacteria, parasites, you know, mold, toxins and Lyme and all kinds of different infectious things.

And and it's silent. People don't necessarily have to show up in a classic I have an infection profile, right. They think of infection like I don't have a fever, so I don't have an infection.

But you could have underlying infections that just don't quite clear. And so your immune system stay in a vigilant state because the immune system knows there's pathogen there.

It's actually actively trying to get rid of it, but it's just not able to completely clear it. So you're staying infected while staying persistently inflamed at the same time.

Remember inflammation job is to cure it infection. So it's kind of like, well, if you have inflammation wouldn't you just get rid of infection? Well some people get stopped or they have an infection they can't clear and they stay inflamed.

So you get both infected inflamed at the same time, which is a bad situation. This is really the situation for a lot of people with chronic conditions.

And again, you may not feel it as a fever. You may actually just feel joint pain. You. So you may feel fatigue because inflammation can decouple the mitochondria.

So therefore you have energy issues muscle endurance, tissue muscle pain as a result of, you know, energy problem with more muscular function. So yes, inflammation does or infection does not show up in what people think.

Yeah. So thank you for unpacking that because you're making it very easy for people to understand. So now we've established we've got these chronic infections that you don't know are there.

You've got chronic inflammation. We know what the root cause of mitochondrial dysfunction is now. So now can you connect mitochondrial dysfunction and how it affects the brain immune gut axis.

Because that is your superpower is talking about brain immune gut. Yeah, absolutely. Let's first define the brain and then got access. So there's this connection between the brain and you've got I think a lot of people heard of the brain got access or the brain got connection.

They know somehow the gut and the brain's connected. This explosion of research on the microbiome and how that impacts the brain. But I think the immune system is left out of that equation.

And it's not. The immune system's more important than the brain or the gut. It's a three way triangle. It's a big connection, I call it. And so when you have dysfunction within the brain and you've got access, when one system fails, the other two goes with it.

It's like a domino effect. This is why when you have gut issues, you start to get brain issue. And when you have gut issue and brain issue, your immune system start to fail and then you may not be able to fight off infection.

You get chronically ill feeling like all of the things that we've been talking about, that's the common thread there. Now, how does that tie in the mitochondria?

Again, I think that mitochondria dysfunction is a symptom and result of burning. You've got dysfunction. So there's more about what's causing the brain.

And you've got to fail in the first place. What's causing this whole system to not do well. And I think this all ties back to really the foundations for, you know, how you how you develop someone's health life on the foundation from the ground up.

And to me, the foundation is fuel delivery is your ability to deliver energy and substrate. Right. Gasoline. You got to pump gas into the car. How do you add that gasoline to the car so that your mitochondria has something to burn.

And then this comes down to two primary things. That's oxygenation and blood glucose.

Inflammation, Chronic Infection, and Immune Stress

Right. And in fact we're going to talk about brain, which is a subject that I love. Your brain cells are heavily heavily dependent on glucose and oxygen for.

So in fact it's it's two primary requirement is oxygen and glucose. And then there's a third requirement which is activation. Your brain cells have to be activated right.

You have to use your brain cell. So we have to be stimulated in some way. And but just by the way, by just by living on here on earth, we have gravitational field that presents a constant stimulation because gravity pulls on your

muscles and joint.

So you have joint mechanoreceptors and appropriate after that senses this pressure gravitational field. And that literally keeps our brain cells alive by being in gravity.

This is why astronauts in space don't do well because they don't have gravity. When they come back to Earth, they, like, have to spend a week just learning how to walk.

So that's why they have their exercise in space like ten hours a day. Just keep things going. So brain cells have to be stimulated. But also needs fuel.

And that fuel for brain cell is oxygen and glucose. And I will say that fuel is actually very important for the rest of the body as well, not just for the brain.

So how does this play out is that if someone has poor oxygen delivery, then that's going to impact the mitochondria, his ability to actually produce ATP now.

So why would someone have low oxygen? Yeah, that's my next question. What's causing that. Yeah I mean so this could be caused by for example, if somebody has anemia.

So anemia is defined as having low red blood cell, low hemoglobin, low hematocrit. These are all things that you can measure on a regular complete blood count panel.

Just a lot of times people don't look carefully. But you can see on that panel whether someone has anemia. Now there's many different types of anemia because some anemia is due to iron deficiency, but you can have other also B12 deficiency anemia.

You can have pernicious anemia, which is not only anemia you can have anemia. Chronic disease. You can have genetic issues like thalassemia and sickle cell anemia.

But you know that anemia means that you can deliver oxygen and we can deliver oxygen. Your your cell is going to suffer because your mitochondria doesn't have enough to work with to produce ATP.

That's a really common scenario. So people who are having perhaps low stomach acid, then they're not absorbing the food that they're eating. They can absorb iron.

So they may develop iron deficiency anemia from simply not absorbing the iron that they're eating. They can have, you know, autoimmune, where the immune system's attacking the parietal cells in a stomach lining and parietal cell produce stomach acid.

So if you have autoimmune attacking the cells that produce stomach acid, that you can't produce enough stomach acid, then, therefore, you're not absorbing iron or B12, then that can also produce anemia.

I just want to highlight something you just said because I, you know, lived in the Western world before learning functional medicine for 20 years. And I'm thinking back to all the iron deficiency anemia people that I treated with iron when what they really needed was digestive support.

So they could actually absorb iron. I just want to highlight what you just said there because that's the solution. The solution isn't throwing ferrous sulfate at somebody.

The solution is fix the GI tract or find out why they can absorb that ferrous because they may have H pylori. Yeah that K is they they need to get rid of that.

Or they may have just low stomach acid production due to various issues or even due to vagus nerve issues. So they can't produce stomach acid. So it's always about asking why right.

Asking the why behind the why. Yes. And this is critical for this is just so the audience is clear. This is what makes you so amazing, Peter, because this is what functional medicine is.

You you get down to the root cause of solving that problem so your body can correct itself. And that's what you do. Right? And this is why I say mitochondria issue is a symptom, not the cause.

Right now it's mitochondrial dysfunction itself can cause symptoms. Yes. But what caused the mitochondria dysfunction in the first place. And and I think we can just ask that of questions.

We're going to get better answers. And to me fuel delivery is one of those kind of, you know, it's almost like it's too easy. You know, people are just like, oh, it can't be anemia.

It must be like, I need alpha lower like acid. It must be like I need, like, you know, malic acid, some mitochondria or Krebs cycle metabolite. It must be, deficient in that.

Well, sometimes it's just literally you don't have oxygen, right. So we have to, like, go for the, the the high percentage of play and things that actually happen clinically again just through experience, you know, is it is it a lot more common for people to be alpha lipoic acid deficient, or is a lot more common for people to be anemic?

I say anemia happens more often than people who are deficient, and I like acid. So therefore we should look there first. So before we go into blood glucose and the importance there any more pearls on oxygenation.

Absolutely. I mean, another way that oxygenation problem can come is if someone has, low blood pressure. Right. So people are hypertensive, you know, normal, normal pressure is 120 over 80.

How Mitochondria Affect the Brain, Gut, and Immune System

And, you have people walking around with blood pressure that's, you know, 105 or 65, 100 and over 60, you know, 90 over, you know, 655 now, just because you have lower pressure, right?

100 and over 60, it doesn't automatically make it. So that's bad. I want to make that perfectly clear, because a lot of times people take this out of context, say, well, doctor, can't say 100 over 60 is like the limit for bad.

So if I have 160, then automatically I have a perfusion problem. Not necessarily because some people 160 is just normal for them. The thing is sure is that do you have hypertensive symptoms?

Meaning do you get lightheaded, dizzy. You know you get orthostatic hypotension. Well you change position, you get dizzy, and then you have like mental endurance problem.

You have fatigue associated with it, which is a mitochondria issue. Because you don't have perfusion. You don't have pressure to deliver blood to your tissues.

So therefore you can't get oxygen and glucose into your to the mitochondria. Therefore you have mitochondria issue. So this hypertension is a big deal.

But you have to ask yourself do you have hypertensive symptoms. So there's a checklist checklist that we have you know when we help people do this. But if you do have hypertension then that's something that need to be addressed because that can cause you to have deficiency in fuel delivery, not just oxygen, by the way, in the way that you deliver glucose, in the way that you deliver, any type of nutrient in a way that you remove waste.

It all depends on pressure, right? Circulation for that to happen. So I think that's another thing that's often missed because in Western, our path in medicine, high blood pressure is like the villain.

Right. It's the bad guy. You know, obviously high blood pressure is very deadly is something that needs to be, you know, addressed. But low blood pressure is often kind of brushed aside.

Oh, your blood pressure is low. You're never high. Blood pressure. You're suffering. Yeah. Good for you. You're never going to have a heart attack. I mean, wow, the person feel like crap at the.

And I told that, you know, that's probably a little bit too low for you. And you feel like crap too. So that may be something we want to address. Okay.

So should we talk about blood glucose glucose as the next big factor here. Yeah I've point those is such a common thing in especially in America. Right.

And they eat a standard American diet American standard American diet. Blood sugar dysfunction is a very common end result of that standard American diet because it's full of carbs and sugar and hidden sugar and fake sugar.

And so people just over consuming those things and, and plus you add that to sedentary activity, you're really creating a really perfect storm for, for blood sugar dysfunction.

And this is why you see so many people that are overweight or obese by obesity is one of the number one things in America. Like as far as how many people have obesity, I mean, the numbers just keep going higher, not lower, despite the awareness of like I mean, there's no shortage of podcast and some interviews on blood sugar, but there's still so many people that have a weight issue.

A lot of it due to just, you know, just not understanding how important blood sugar dysfunction is. Now, blood sugar dysfunction comes in primarily two flavors.

You can get the hypoglycemic or you can be insulin resistant, although there's a third type where you can be both hypoglycemic and insulin resistant. This is more symptomatically.

You can experience lows and highs, right. So on lab work your blood sugar may actually look normal it because you have lows and high. So when you average out the lows in high your blood sugar number looks normal.

But your symptoms wise you show signs of hypoglycemia and also insulin resistance. Now hypoglycemia is bad because then you have low glucose level and we don't have enough glucose.

Your brain cell doesn't work. Your cells cellular machinery to produce energy is going to be compromised. Now on the other hand, insulin resistance is just as bad because when you have insulin resistance, you can't get the glucose into the cell.

You have too much sugar stuck in your blood because the insulin is no longer working. So you have high blood sugar. This is a mechanism for diabetes, but that glucose cannot go into the cell to be used for energy.

So your mitochondria are starving for energy. And this is why people experience hypoglycemic symptoms. What fatigue brain fog anxiety shaky lightheadedness right.

Hangry I mean hangry is a brain symptom. Hangry is not like your bicep or your muscle. Hangry is a brainstem. This is why when you have low blood sugar, that's a perfect example how your brain is so sensitive to glucose level.

So so take heed of that. Right. You want to take steps to stabilize your blood sugar. It's such a low hanging fruit and easy thing for most people to to actually fix it.

Because a very lifestyle modifiable. There's certainly mechanism for blood sugar dysfunction that may be more complicated. Some people may have autoimmune, right.

Type one diabetes. They, may have an autoimmune to specific enzyme like glutamic acid, carboxylate gas, 65 enzyme that can make it more difficult for them to process blood sugar.

There may be other mechanisms for why they have blood sugar issue, but more common more commonly from majority of the people. It's something they can fix through diet, exercise, and managing stress actually.

Also. Yeah, yeah. So we're going to talk about how to restore mitochondrial function. And real quick, can you just touch anything else you want to say about immune system and mitochondrial function?

I mean, we talked about inflammation. We talked about gut. We talked about these problems oxygenation, blood glucose levels being too low. What about the immune system?

Yeah.

Oxygenation and Blood Sugar as Foundational Drivers

I mean, the immune system is important here because, Andrea are they're sensitive to, damage, the sensitive to inflammatory influences. And so when your immune system gets tipped toward an inflammatory state, remember, inflammation is not a switch.

It's not like you're either inflamed or you're not. Right. There's many degrees that your body has different gradients, and you can go from not inflamed at all to like, mildly inflamed to moderately to very inflamed.

So it can shift back and forth. A dynamic situation. So, you know, it's not like you're inflamed or you're not. It's like, how inflamed are you? And how does that correlate with other things that's going on in your body.

Like do you have infection going on at the same time? Do you have leaky gut going on at the same time? Because these things all can skew that the inflammation to a certain degree, or make that inflammation more resistant or harder to fix if you have certain issues.

Okay. But to be sure, inflammation is going to cause mitochondria issues, then therefore you get energy. So this is why people a lot of time they maybe the blood sugar just fine and they don't have blood pressure problem yet they're still tire because they're just simply inflamed.

And one of the ways that can cause this energy issue is due to the disruption the mitochondria. Although inflammation can also block thyroid hormone function.

So then you get thyroid hormone resistance. Inflammation can also create, you know, cortisol problems. So you're releasing too much cortisol. Then you get cortisol resistance.

So then that can also causality. So there's a lot of ways that inflammation can cause fatigue. So I don't want to just say it's all about the mitochondria.

But certainly it can damage the mitochondria as well. And again I want to point people to the fact that let's just make it practical for them. If you have blood sugar dysfunction, you're going to tip your inflammation more to the inflammatory scale.

If you have leaky gut, your gut barrier is like a factory for inflammation. Remember when I when we say inflammation, I think people should right away think about inflammation.

It's how your immune system kill infections. That's what it is. So inflammation is not bad. So why is the gut lining a factory for inflammation? Because that's what when you put food in your mouth right.

It's the place where your gut meets the external world in the food that you eat. So it's it's lined with inflammation because it's there to kill infection that you might put in your mouth. This is purpose for it.

But because it's a factory for inflammation, if you putting way too much processed food and or food that you're sensitive to, or you get this biotic, then the statutes turn out way too much inflammatory chemicals.

And that's going to have a devastating effect, because when you have way too much inflammation, you tend to start to shut down your immune system, ability to fight off infection, like it's almost like too much of a good thing.

Your inflammation supplies kill off infection, but when you have too much, it actually suppresses certain populations of immune cells that are there to kill kill pathogens.

They get suppressed in the presence of way too much inflammation. So then you get this imbalance and people start to get chronically infected and chronically inflamed at the same time, which I have a mood.

Yeah. So what I have a feeling you're going to say is as we transition into talking about restoring mitochondrial function, it matters what you put in your mouth because as you just said, your gut is there to kill off infection or anything that's coming in from the food.

So let's talk about how do we restore this? How do we fix this? I have a feeling food is a big one. Absolutely. Food is big is is one mechanism. And but what we want to really think about it is more in a big way.

I call the big for me, you know stands also for brain immune gut. I call it the big idea or the big connection. We want to think in terms of how do we restore bringing mean gut function by using a roadmap and roadmap.

This neuro metabolic roadmap is something that I developed through just clinical research and just years of experience. Finally, come to a realization that you have to address these chronic conditions step by step.

You cannot just go in and guns blazing and throw the whole kitchen sink at it and everything else at it. You know, taking 50 supplements or 100 supplement is not the solution to the problem.

Prioritizing and sequencing this reset is the way to get the best result, because then you're clear on what step that you're working on. So you're not like jumping on something that's like chasing shiny object syndrome.

So just to give you an example, or the first two steps is what we already talked about oxygen oxygenation and blood sugar stability. Right. Because without those your mitochondria is going to suffer and so is everything else.

So by fixing that you're going to impact a lot of things. Like where do you have mitochondria like every with cell in your body. So by doing by improving blood sugar stability and improving oxygenation, you're improving potentially the function of every single cell.

And by it it's going to have a huge impact where if you like, you know, take a probiotic. Is that necessarily going to impact the mitochondria in a in as large a degree as addressing oxygenation?

If you have a problem with that or blood sugar problem, probably not as much. Right. Taking hydrochloric acid to support your, you know, gastric, acid status is important, but it's not going to have as big of impact on mitochondria as blood sugar stability and oxygenation.

So again, if we can take a step by step approach, a prioritize sequence approach, I think people are going to do a lot better. So so that comes down to, yes, the food that you eat, right.

So you can eat in a way that does not promote insulin resistance. You can eat in a way to help you if you have hypoglycemia. So people with hypoglycemia can eat small, frequent meals.

Right in the beginning, you know, always the goal is that you shouldn't have to eat small, frequent meals just to survive for the rest of your life. You're eating small, frequent meal if you have some double hypoglycemia, so you're maintaining your fuel stability until you get better and you address the underlying reason for why you even have hypoglycemia in the first place, which may be lifestyle, which may be stress, which may be inflammation, maybe adrenals.

Right? It's always about asking the why of the why of why. But why don't you get the blood sugar stability handle

that you may be able to go to where you're not eating as frequently because, you know, I know a lot of people like I thought fasting is good, fasting is good.

But you know, you can't like that. The plan is not to, like, never eat, right? Like, yeah, what if you just don't? Yeah. Just eat nothing for 30 days.

Like, that's not a plan, right? It's not sustainable. And you can't and you can't fast out of the gates if you have hypoglycemia. I was laughing earlier in my head when you were talking about hangry, because I was always known in my family and in my closest friends, as you better feed her because she gets hangry.

So I had major, you know, fluctuations in my blood glucose levels.

Digestion, Absorption, and Gut Support

And I always had this underlying kind of I'm thin and active, but I had a higher hemoglobin A1, C and and it was always like an anomaly. Like how is that possible? Because I'm thin. Right.

But I had, you know, dysregulated blood sugar. Anyway, there was no way I could ever have intermittent fasted or fasted. I would have killed somebody if you told me to.

Fast. And now that all of that is cleared up and I can go, I can fast every day. In fact, I'm fasting right now while we're talking, while we're shooting this interview, I won't eat for another, you know, four hours till about noon, 1:00.

And I can do it now. So anyways, side just a side thing, you got to actually a real thing that you mentioned Laura, because the this goes back to, you know, summit.

Great. Well giving people a lot of information. But I think people have to learn to exercise discernment and wisdom. So they're taking the information and say, okay, does that fit in me?

I think hundred people, they go on, oh, fasting, summit fasting is good for everyone. And while this person is hypoglycemia and they're trying to fast because they heard fasting is good for you, well, it's probably not good for you at this moment in time.

You got to fix that first to get to the point where you could fast. So the fact that you kill fast now, Laura, means that you're you're healthier. You got to the point you can't do it.

Yeah. It's all about just making sure that you're, you know, using this information correctly to fit your specific circumstance. I think the biggest takeaway that I can give to people is that you want to have more nuanced approach, right?

So as you listen to the Mitochondria Summit, this summit with all these great speakers you want to pay attention to, okay, this is fit my specific situation.

You take the information in, right, put in your database and buy the recordings. But see if the how the information fits you. You know, a lot of my education is teaching people how to do assessments to understand, okay, if you have this pattern that makes you go that direction, if you have this pattern, you go that direction.

So you're not taking the same thing, cookie cutter for everything, you know, like that might be right for somebody else, but not right for you. Yeah. And so I'm so glad we went down that little side note, because there's so much information coming at people from summit.

So thank you for for sharing that. You know, you really have to take what makes sense and leave what doesn't for now. You can always come back to it later.

So all right, so what else do we need to do to focus on restoring mitochondrial function? You've talked about your

big I love that the brain immune gut big plan.

We've talked about oxygenation and blood glucose is foundational to healing this. Where else would you go. What other pearls would you give? Well, another, you know, it's not a side.

But, you know, when we talk about the roadmap, you know, the roadmap that I use, you know, it's oxygenation, blood glucose and then this digestion. Right.

Because if you can't digest your food, then you're not going to extract nutrient from your food. If you can't extract nutrient from the food, and it doesn't really matter what you put in your mouth, you're not extracting the nutrient from the food anyway.

So I see digestion and absorption is the next foundation. That's where the gut, you know, aspect of it come in. Of course, digestion. There's many parts to it.

You know, there's there's vagus nerve, there's just mastication. And then there's the stomach acid. There's pancreatic enzymes, there's bile, there's intestinal permeability.

So there's a lot of parts to it probably beyond, you know, what we're going to talk about. But I think just for people to understand that digestion is really important, really think about how to optimize your digestion.

I think an easy way to optimize digestion, really make sure they're eating in a non stressed, you know, situation. Right. Because when you're stress eating then your vagus nerve is really not functioning as well.

So you're not priming the digestive pump. You want to make sure you're chewing your food. So because that the actual the act of chewing slowly, you know, 40 bites before you swallow actually activate proprioceptive in your TMJ.

And that actually has an effect on stimulating the vagus nerve as well. So so you want to eat, you want to inhale your food in a hurry on the run, right.

That all along will help the digestion. Yeah. So a lot of people have hypochondria then, you know, this is where using, you know, putting hydrochloric acid or apple cider vinegar to acidify the stomach can be very helpful.

So that's just some quick things to do just in that very top part of digestion. There's certainly other things we can do down below, but you always got to start from the top, right?

When it comes to digestion, you start from north to south. You got to start on very top brain stress, vagus nerve, chewy stomach acid. And then we'll work our way down.

Oh, that. I love that analogy. That makes so much sense. It makes too much sense. Is a fault of my. It's a good thing. That's a good thing. All right.

Any other pearls on restoring mitochondrial function? Anything else you'd like to share? Yeah. And lastly, I certainly we don't want to leave out exercise.

Right. Because we talk a lot about, you know, food and diet and yes, that stabilizing blood sugar, you know, eating more protein, less carbs, less sugar, anything that's going to have a high glycemic index, a spike in blood sugar, those are all important, right?

Eating your vegetable feed. The gut microbiome all important. But it's not just about what you eat. It's also how you move. So mitochondria really responds well to exercise.

And of course within exercise there's a lot to talk about.

Exercise and Aerobic Training for Mitochondrial Health

Right. Because we have the aerobic exercise and we have, you know, the high intensity type of exercise. We have strength training. So there's many different types of exercise in general though for our mitochondria, the aerobic part is probably the most important.

It doesn't mean that strength training and high intensity stuff is stuff is not important. They're all important. You should be doing all of them in a, in a regimented in a program way.

Right. But the aerobic part is probably what's very under load for most people. They're either not doing enough. So they're not getting a benefit from their exercise, or they're doing too much where they're actually doing anaerobic and it's not aerobic.

Oh, for example, a spin class is not aerobic. It's completely anaerobic, although it's a cardiovascular exercise. Well, it is a cardiovascular exercise as an exercise is any exercise that raises your heart rate.

So if you can do 100 yard dash that's cardiovascular. Your heart is going up. If even doing strength training, you know, like your heart rate will go up while you're doing a set, that's that's kind of how some cardio, you know, vascular effect.

But that's not aerobic. Whether it's aerobic or anaerobic, it's describing the energy system that you're using. Anaerobic activity in a true aerobic zone actually is what drives your mitochondria to help you.

Do, you know, burn fatty acid using oxygenation. And that has a tremendous amount of benefit. So I just want to point people to, you know, exercise. Right.

And all you have to do for the aerobic stuff just go off a walk. But you have to walk in a certain intensity to make sure you're in a true aerobic zone.

Yeah, yeah. Not a leisure walk. Right. You got to get your heart rate up. You got to, you know, be able to maintain, conversation while you're still breathing hard.

Right. So if you're working too hard, you can't even, you know, speak, then it's too hard. High intensity. If you're just strolling and your heart is not even moving up, then that's probably too easy.

So there's you can use a perceived rate of perceived exertion, the breath test, to give you intensity. Or you can use a heart rate monitor and measure it.

This has been so good. This has been so good. Doctor con, thank you so much. I want to make sure everybody knows how to get Ahold of you, where to find you.

How to how to be, a part of your big roadmap, plan. Where can we. Yeah. Thank you for connecting with that. Yeah, I'm. I actually have a lot of just free content on YouTube.

So you can just go to YouTube, and type in Peter con DC, just my name, DC or the DC at the end. And, there's like over 14 and videos on my YouTube channel.

Yeah, it's very highly watch. So I think that's a great free resource for people. If you like more of this type of content. My website is ask.com.

Where to Find Dr. Khan and Final Takeaways

Com and then our masterclass is, you know, a big masterclass at but, Laura will be, helping us to promote that, so. Well, Laura, I'm sure it's going to send, links, you know, to our, to our audience later at a later time.

Absolutely, absolutely. Thank you so much for breaking this down. It's always such a pleasure to have you speak on brain, gut and immunity and to really bring in mitochondria and connect all of that in a way that's easy to understand.

That's the key. Making it simple for people. Because if it's not simple, it's going to go in one ear and out the other. So you break it down. So simply.

Thank you so much. It's always a pleasure. And I hope people, people, get a lot of, you know, practical use and really take it to heart. You know, some of these things are really actionable.

Go and do it today. Thank you. Peter, take care now. Bye. Thank you.