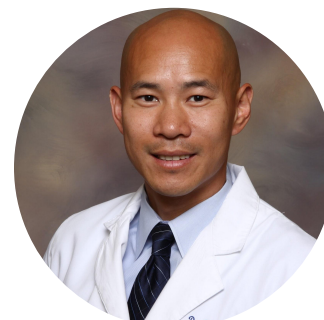




Resolving Brain-Immune-Gut Axis Dysfunction

Jason Prall

with **Peter Kan, DC, DACNB, FAAIM, CFMP, CGP**



Jason Prall

I'm so excited to introduce my next guest, Dr. Peter Kan, supports and manages clients with chronic conditions using a comprehensive approach by merging the exciting advances of functional neurology and functional medicine. Dr. Kan is a board certified in Integrative Medicine, functional medicine and a board certified chiropractic neurologist. He is the creator of the neuro metabolic integration, a science based virtual online coaching program that identifies the root cause of autoimmune and other chronic conditions. Over 5000 clients from across the country have come to seek out his holistic approach that is changing the lives of those suffering from chronic conditions. Born in Taiwan and immigrated to America at the age of 13. Dr. Kan has a deep appreciation of Eastern wisdom and Western advances in natural health care. He believes in the God given ability of the body to heal and regulate itself. Dr. Kan, thanks for joining me.

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Thank you so much for having me, Jason. It's a pleasure.

Jason Prall

Well, you know, I really do appreciate that about you. The Eastern plus Western. Right, This is a passion that I have. Just in my own investigative search for what health is, right, I mean, what is health? Where does it come from? How is it maintained? What is life? These are deep spiritual existential questions that have been investigated for thousands and thousands of years from many, many cultures. Right, So there's so much wisdom in some of these ancient traditions and so anybody that's looking into that and at least considering it as part of a Western approach I think can really come up with some profound insights into how maybe even deeper wisdoms that Western medicine holds that it doesn't even realize yet. Right, So there's really, really cool things there and and and before we got on your we're talking about functional neurology and uh something I've grown deep appreciation for. So maybe we can start there just

if people aren't familiar with functional neurology, how is that different from functional medicine and what are some of the key aspects of why it's such an important area of study?

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Yeah, that's a great, that's a great question to start off with, because I believe that understanding the brain is a key part to understanding anyone with chronic conditions, right? Not just bring specific neural degeneration, degeneration disease, but any type of chronic condition, there's always a brain component to it. And so the difference between functional medicine and functional neurology, I guess it's more similar than it is different because both are looking at the underlying mechanism of why someone will have a specific symptom or specific condition, Right. We're looking at the root causes as a nonlinear type of thinking, but it's still very base and grounded in science and anatomy and physiology. Very much so actually, so, we're just using the understanding of the basic how the body works and we're reverse engineering to understand where the symptom come from, that's really what it is, I think in functional neurology, what we do is we try to identify a longitudinal level lesion.

So what that means is that you have neuro access. Right? So bringing up the brain and spinal cord and all the spinal nerve roots that innervate every single part of the body. And in functional neurology we seek to understand, okay, where is the level of the lesion? Is it all the way up here? In the cortex is in the brain, stem vagus nerve is in the cerebellum, is in the spinal cord or peripheral nerve. So we try to understand where is the actual problem and then we will apply specific therapies. Now the therapy could be specific type of exercises, specific type of therapy that we can aim at a specific part of the brain. This could be electrical stimulation, this could be adjustments, this could be manual therapy like massage, this could be vibration or temperature or sound or light stimulation to the eye. So any type of these natural ways that we can stimulate the brain or different parts of nervous is that's what we do.

Now I would include that we can also stimulate the brain with nutrition. For example if you have no transmitter deficiency and your dopamine you have low dopamine and dopaminergic neurons don't fire as well because you're lacking the precursor to form neurotransmitters then taking nutritional supplements that give you the precursor. So you can make more dopamine can have an increased frequency of firing of that neuron. That neuron will have more fuel to be able to make neurotransmitters therefore will help it fire better. Okay, so there's different ways that we can go about stimulating the brain. So understanding the brain and applying in a functional model, I believe really helps me personally and I believe will help all practitioners to apply functional medicine better. Because you have that brain component that you can actually



further explore where you may not have gotten, you know, or plateau or not gotten anywhere with a particular patient.

Jason Prall

I couldn't agree more. That's a fantastic way to approach that. Right, Because function medicine is a great integrative medicine that it's a framework through which we can look at disease or or health or dysfunction. Right? And so when you have a functional neurology background, you understand how the brain, the nervous system uh is functioning and how it relates to all the other systems in the body, like that is the key component. And so with that sort of central foundational understanding of probably the most foundational system in the body then we can start to understand these things like gut dysfunctions and chronic pain and sleep disturbances and hormone imbalances and all these other things. Right. And so I know that's a one time sort of tapping into one of your big area of focus, which is sort of this access between the brain the gut and the immune system. Right? And sort of you've kind of coined this sort of big idea or big uh sort of acronym, right? The brain immune, gut and it's beautiful. I wonder. I'm curious what is it about those three systems that you find are so synergistic in terms of the dysfunction and and the function of the harmony. How are those systems related sort of on a big picture level?

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Yeah. And you know, I actually, I don't wanna say stumbled onto it. It's really just a lot of years of practice, you know, at a very high level and just paying attention, right? Because it's very easy in practice to just do the same thing over and over again. Everybody leaky gut, just take this. And then, you know, whether people got better or not. And sometimes, you know, practitioners can blame it on something now as well. They didn't follow the protocol or, you know, they have Candida or they just old. But if you really pay attention, what I found how I stumbled onto this big idea is that I see when people come in with Lyme disease or they're coming with mold issues or they're coming with fibromyalgia or they're coming with Hashimoto's right, all these conditions and every time when I take an inventory and assessment of what they're struggling with, invariably all these people with different conditions, all come with three sets of problems. Brain symptoms, immune symptom and then gut symptoms like almost without fail.

If you have fibromyalgia, I'm seeing people with brain symptoms like brain fog and fatigue and they have immune system problems like inflammation and they have gut issues like gas bloating constipation. When I see somebody with Hashimoto, same set of problems. When I see people with Lyme disease, similar set of problems, certainly there's some differences, but I sort of see this common denominator of brain immune gut symptoms. Doesn't matter what the diagnosis is, which is another reason why I started investigating it more because that helps



simplify the clinical process. Because if you're chasing diagnosis, you'll never get there because the diagnosis doesn't tell you what's causing the diagnosis, but by focusing on what's the common denominator between all these people with Lyme and mold and Hashimoto's and stuff like that that have similar symptom then that help us to be able to target the common denominator, which in this case turned out to be this interconnection between the brain, immune and gut. Now, it's no secret that there's a brain gut connection. Some people say the gut brain connection, I think depends on who you talk to. They may say the brain, gut connection, if they favor the brain, they may say the gut brain connection, if they favor the gut more, kind of like the person who says gut brain connection may say that the gut controls brain function, or and the person who say brain gut, they will say the brain controls gut function.

Jason Prall

I've noticed this. Yeah.

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

You know, so and reality is that it's a bite, it's bidirectional, right? So we don't want to be we don't want to be so skewed to the fact that it's not that the gut is more important in the brain or the brain is more important than gut. They're both equally important because in the body it's not the body's not compartmentalized, Everything is working at the same time all the time, every single part of your system is connected and communicating at the same time. So we want to think about it is how are they interconnected? So we have the brain gut axis that's already been talked about many many times. And I think that my contribution to this will be that I'm bringing the attention to the immune system as part of this brain immune gut connection. Because if we just say brain gut connection, we're kind of just thinking, oh, you know, your gut is dysfunctional, take some probiotic and your brain, your depression will go away.

Well, it's not that simple, right? Certainly there's research in that field that shows that yeah, your microbiome is not working right? It can definitely impact the brain in a way that can cause brain inflammation that can lead to depression, anxiety and so forth. And some studies have shown that improving the gut microbiome can improve those mood disorders but not in every single person, right? We can't say every single person with depression that take a probiotic that depression is gone. So certainly it's not a 1-1 ratio. So then there's other things that's involved in it. So again, the point of bringing in the brain immune gut is not just get stuck on, oh, just fix my gut and everything in the brain will get better. It's to realize that there's a brain immune, gut connection and there's a three way triangle and furthermore between the brain immune gut. There are many factors that can throw off the brain, immune got access. So it's not just like, okay if I just improve my brain is gonna be fine. So let me take a supplement for my immune system



and you take a supplement from my gut and take a supplement my brain and everything will be okay. It's really understanding the brain in your gut. Is that how symptoms manifest and how these three systems coordinate so that you can have proper function, but that there are other root causes and other triggers that can throw off the brain or the gut. So that that became a framework for a roadmap that I developed a clinical role map that helped me to simplify the process of solving complex condition. To make it simple, right? It's not necessarily easy, but makes it simpler. So we're not chasing 50 different rabbit holes, but be able to like, okay let's focus on this brain and you've got access and what do we need to do 1st, 2nd and 3rd, and be able to get results in a more predictable way.

Jason Prall

Yeah, no, I think it's it's critical that you're pointing to this this this connection between all three in this interrelated aspect because you know, this is where if we can accept that that premise and that idea and this is where we can we can look at things like and you mentioned before a new functional neurology sort of intro things like light, things like sound, right? These sort of stimulative aspects to the brain. Well, if we can conceptualize that the brain is connected to the immune system in the gut. Now I can understand that sound, that light can actually impact my immune system, can actually impact my gut. And that's a fascinating thing to try to work out because we may not know all the exact mechanisms or perhaps some people do, but this is where I think it becomes really profound when you create this triangle of interconnectedness between these three systems.

Now we're starting to recognize, oh, it's not just what I eat that impacts my gut, but it's not just the probiotics, it's not just the maybe fasting or or what things that I do to directly try to impact the gut system, but it's all these other things too, right? It's the exercise, it's the sleep, it's the emotional turmoil or stress or perhaps childhood trauma that's affecting things, right? Like there's so many things that start to work into this triangle. And now I can understand that there's a helps bring me into a framework whereby all these other things can start to make a big impact on all these three systems. Right?

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Absolutely. And I think you brought up a very good point Jason that, you know, it's speaking of light and sound, how that impacts the brain. Okay, so people might be asking, okay, so light and sound, you know, your brain process light and sound. How does that throw off my immune system or my gut? Well, let me give you an example if I may because this will help people to see that connection. So light and sound when it enters your brain, right? Light perceived by your eye and then sound perceived by your auditory nerve go through to a part of your brain that's called



the missing cephalon. That's a part of your mid brain. The midbrain is on the very top of your brain stem and that's the very top of your autonomic nervous system Control center. Okay, so the autonomic nervous system is a part of the nervous system that controls everything on autopilot, including your heart rate, your sweating response, Fight or flight response. Parasympathetic nervous system function, digestion. So that Miss and cephalon, which is the midbrain, has an area in there called the superior curricula sauce and inferior curricula sauce. And this is where the light and sound information. Ultimately after filter through the optic nerve and auditory nerve filter through those areas in the missing cephalon. So why am I telling you this? Well, meaning cephalon is the starting point where that nerve signal for sympathetic response comes from. So your fight and flight response comes from the missing cephalon. Okay, so what that means is that if you shine a light in someone's eye and that's really bright, you actually will trigger a sympathetic response not necessary.

This person would freak out and panic, but you'll start to see pupil constriction and that's a sympathetic response right now in someone who's already sympathetically driven, like in a fight or flight response chronically to the point where they're or they have PTSD, that's driving a sympathetic response to the point where they're constantly anxious, not sleeping well, they're getting inflamed because of it because there's a pathway from being in fight or flight triggering inflammation that's called neurogenesis inflammation. So when you're already stressed and fragile and inflamed and in fight or flight and you shine a bright light into someone's eye, you might actually just overwhelmed that area that's already on fight or flight and you shine extra light input, which triggers more fighter flight. Now, they just get pushed into panic mode or they crash, they start feeling terrible. In fact, you know, people with migraines many times they'll yeah, bright light, loud sound noises when I have migraine.

I have to go into the dark room, shut all the lights off and right. And a lot of people experience it even if they don't have migraines, chronic condition, many people will say, yeah bright lights and loud loud noises bother me. It makes my fatigue wars with brain fog wars. So that's the connection between the brain stem and light and sound input that can potentially potentially a sympathetic fight flight or flight response that can actually make their immune system more activated, which makes them more inflamed. So that your brain immune connection and when you get into more fight or flight response then you're decreasing the parasympathetic function which decreases vagus nerve function. So now your digestion is compromised. So that's your brain gut connection. So you have this brain immune gut connection that can be triggered in someone that get exposed to too much light and sound if they're already overly activated in that part of the neuro access. So this is where identifying a problem in that specific region can give us clues and even how to help that person. Maybe we can block out some light and the red glasses



or you know, block out some sound, you know, put uh earplugs when they go to you know, store when it's very loud and so forth. So those are things that we can do to help that person get better.

Jason Prall

Yeah. And you know one of the tests that I know that sometimes done in functional neurology is you might snap into somebody's ear, right? And fairly moderate sound, but it scares the heck out of them, right? And then you have a really strong response, right, these type of things. So that's a perfect example where there's something going on at the brain level, right? And if you know that and then you have an understanding of how it's connected the immune system and the gut. Now we can really trace a lot of dysfunction that's going on in the body that seems not really connected, Right? So this is again pointing to functional neurology and with some of the amazing tools that you guys have to do to do an analysis on the different regions of the brain.

And another thing you thought of that I thought of, as you had mentioned that we're all familiar with is sort of this preset phallic phase of digestion, right? So even smells right? Like if somebody's cooking an amazing meal and we smell that well all of a sudden, you know, if things are working properly, we start to salivate, right, that digestive function starts to increase, right? So I guess I'm just continuing to point to this idea that there's so much interrelated aspect to to these things that you're talking about and why it's so important to to focus on all three, right and not just one, which is a very common thing, you know, when you when it comes to autoimmune dysfunction, right? Or any inflammatory hyper inflammatory conditions, there tends to be this.

Look at TH one dominance, TH two, you know, and really hyper focus on the immune system. We can kind of lose sight of the fact that, you know, maybe there's some brain dysfunction going on. Maybe maybe there's really, maybe the gut is driving this thing, or maybe it's all three. Right? So maybe you can talk to me about some of the kind of autoimmune conditions, since this is a fairly rampant issue that we're seeing now, whether it be, you know, directly autoimmune, or perhaps even uh food sensitivities, and some of these things that we're seeing on that side, how does the brain come into play as well as the gut? And and and how do we think about that from a resolution perspective?

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

That's a great question. And I think I want to start with what is kind of maybe intuitive for most people who's heard of the brain gut connection, and it's that if your brain starts to lose its frequency of firing. When I say, frequency of firing, meaning that your neurons you bring self fire in a specific frequency, right? They fire on and off, like this. And that's why when you do e g you



have the alpha wave, you have the delta wave? These waves are. How fast is your brain kind of beating like this? Right? So a delta wave when you're sleeping is beating slower. Like a five hertz or an alpha wave. You're about 10 to 15 hertz for beating about 10 to 15 times per second. So your brain has this frequency of firing and that drives the brain function. So in someone whose brain is inflamed or lacks fuel delivery to the brain then that brain cell may not be able to work as strong. It's kind of like you know you have a horse, you're trying to race horse and you don't feed the racehorses any food and then you want to run and it doesn't run. So run slower. So we have a slower frequency of firing. Not only do you experience it mentally, such as brain fog, difficulty retrieving words you may have you know short concentration problem, focus issues. You may have short term memory loss, you would have neurological symptoms. But downstream what happens is your brain drives this your access downstream like through the vagus nerves of the parasympathetic, through the spinal cord. So if your cortex your brain's not firing then everything down below will be slower as well. So this can result in decreased vagus nerve function, decrease parasympathetic and much of brain function by the way is to inhibit sympathetic. Much of what your brain does is inhibit the monkey mind. Right?

Jason Prall

Right.

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Yeah exactly. It's to put the brake on because by default we have a monkey mind. By default we're sympathetic. By default we have the lizard brain, the primitive brain that's always driving us to be aware of predators and look for food and so forth. So much of the brain's function is to put the brakes on things so we can stay calm. Right? That's the expression the ultimate expression of a highly functioning and actualized human is one who's, you know, like a zen master that's meditating and someone is meditating is not monkey mind, like fidgeting and moving all around. So the brain's function is to inhibit and calm us down but we lose that brake pedal then things downstream, some function will slow down, right? Some functions that require activation like para sympathetic and vagus nerve will slow down and other functions that need to be inhibited like blood pressure and uh and you know, a sympathetic response will not be put on the brake pedal, therefore over express. So we can start to have this downstream effect. And this is really important because if you have brain symptoms, you have to start to realize that that's going to have effects downstream. You can't just say, well, I just have depression. Well, if you have depression or brain fog, that automatically means that you have some problem within your brain, meaning you're not either you're not getting fuel or nutrients, your brain to make certain substrates or neurotransmitters or your brains inflamed therefore can carry out function. So you have to think like that and then downstream what other effects and



they have and the effect is really far reaching. So coming back to autumn and I set the stage here. So how does that impact autoimmune? Well if you have decreased brain function you may have decreased vagus nerve function. It's very well known that it does that you know it's not just a vagus nerve, it's just an overall parasympathetic function.

Jason Prall

A lot of people have heard of vagus nerve but maybe just to give us an idea of what the vagus nerve does for those who aren't familiar.

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Yeah, the vagus nerve is a part of your cranial nerves. You have 12 pairs of cranial nerves that exit your skull. That's why they call the cranial nerves and the cranial nerves have functions that control sympathetic parasympathetic function. A lot of it controls your facial movement and tongue movement and so forth. The vagus nerve controls your muscles of swallowing and then also go further down and innervate your heart lung has innervation to your gut. And so it's really one of the things that drives your gastric function. Your digestive function as far as the motility and secretion of enzymes and stomach gas and bio flow and so forth. So when you have decreased brain function, everything downstream is gonna be compromised. So then the vagus nerve gets compromised, not firing at the same frequency of firing. So it slows down. So therefore the function that innervates slows down to which will be motility.

So people will experience constipation, decreased secretion of digestive enzymes. So then you don't digest food as well. All of this may lead to food that sits in your intestinal tract because they're not digesting well. Nor is it moving down south. So just sit there and they ferment and that can create opportunity for dysbiosis and inflammation which then can drive a leaky gut. Just so you know your intestinal tract is a factory for inflammation like your intestinal tract is so good at producing inflammation, all it needs is an excuse, right? And then the excuse will be being this biotic. You have too much bad bacteria. Not enough good bacteria. The good excuse could be like eating processed food or food that you're sensitive to,

Jason Prall

Alcohol,

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Alcohol or high blood sugar stress environmental toxins. So it just needs a reason for the fire. Turn on the factory to make inflammation. So your gut is an inflammation factory. And once it turned out that inflammation factory you develop intestinal permeability or leaky gut. You also



drive this inflammatory response in the body that ultimately leads to the increased production potentially of antibodies. And if you have a lot of antibodies which are these immune proteins that targeting specific pathogens. But when you have a lot of antibody production sometimes these antibodies can target your own tissue. So then you develop autoimmune. So you know this is a long train. But it starts with the brain losing its function, losing its break, losing stimulation. The vagus nerve started causing gut issues and started causing immune system problems like inflammation and leading to autoimmune. So that's your brain. I mean, gut in a five minute summary there.

Jason Prall

I love that. You know, you painted a really great picture, right? Because one of the most common autoimmune conditions that we see, particularly in women, is Hashimoto's. Right? So, we take a look at Hashimoto's thyroiditis, right? And we think there's an issue, there's an immune issue with the thyroid, right? There's something wrong with the thyroid. And so uh with your, you know, the picture you just painted Now, we can perhaps take another look at this and say, well, this Hashimoto's may actually be, let's say, uh first related to the gut issues that are going on. Well, the gut issues may be caused by some brain issues that are going on. Right? And so and I mean, and other immune issues. Right? So, I mean, we can have this brain issue causing a migrating motor complex issue that's not allowing the food to move through the gut, creating excess inflammation, leaky gut, you know, the wrong food choices, creating all these Ottawa antibodies, right. And all of a sudden down the line. Here we go. Right? And you're the genetic susceptibility, right?

For each individual is gonna be unique. Right? So this is what I think is fascinating. As we take this old paradigm of Hashimoto's thyroiditis, there's something wrong with the thyroid. And now we can ultimately be looking at the primary issue was started in the brain, right? And the choices that we're making in our lifestyle that cause brain issues that then lead to gut issues. And now we've got the brain gut now causing the immune, right? I mean, it's, and this is where I think when, as a clinician, as a practitioner, what I found is that when the people that come to see me, that's the point. They're at this point where there's multiple systems that are in dysfunction and, and there's still a desire for the client or the patient to say where is the problem, Right? And it's like, well, you know, it's actually everywhere, right? Like we're at the point now where multiple systems are involved and we need to intervene at least in one of them, if not in multiple areas, clean up the entire lifestyle picture, right? And, it can be overwhelming, right? And I don't want to sort of, press that too much, but it's, the opportunities are everywhere to improve, right? And that's really the key difference. It's not like, oh, no, there's problems everywhere. It's actually, hey, there's opportunities everywhere to create a better health outcome.

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

That's a great way to look at it. And I just want to point one thing out, Jason, you brought up a really good point that yes, a lot of people, by the time they come to seek out functional medicine care, the problem has spread to multiple areas perhaps to bring the immune and the gut is all involved. That does not mean that the brain is always the starting point of the problem because it's a three way triangle. Sometimes for some people, the problems started with the Gut, some for other people, the problem started with the immune system having an infection sometimes that they can resolve. For other people it could be, you know, the brain, but invariably, no matter where it starts, all three systems eventually get touched.

Eventually the consequences spread to the brain immune. God, this is why in the beginning I said when people come in with chronic health issues, typically I see brain immune gut symptoms all three because by then it's already spread but may have started with just a brain issue or for another person may have just started with a gut issue, but now it's turning into a brain issue. So I don't want people to think that it's always staring at the brain. So this is why we have to think non linearly be flexible in our thinking but have that framework to help us to say, okay, do we have this brain, you got access that's all dis functioning together or if not, if this person just have got issues, could potentially lead to a brain issue down the line like neural degeneration, neural auto immunity or Alzheimer dementia and so forth. So we can start intervening right away. Yeah, I know,

Jason Prall

I love that. And and and just to kind of give one more brain example to tie in this concept is something like a traumatic brain injury, a concussion, right? And I used to play football in contact sports and boxing in another one. Hockey. Right? There's a lot of these contact sports where, you know, if anybody's experienced a traumatic brain injury, a concussion, Well, it can really lead to some problems down the line in these other areas. Right? So this is where I just want to point to this idea that we think that something like a concussion is brain specific and to some degree it is but then it has impacts throughout the body, right? And and again to take the other side of what you are mentioning, these sort of acute assaults on the gut, right? We may have some acute infection that we acquired, Right? Or we may take a pretty significant round of antibiotics or we may be on birth control for a long period of time, right? And that's causing a specific assault on the G. I. System. And then what are the downstream effects of when something starts to assault the G. I. System? You mentioned leaky gut and the effects on the immune system. But how does that specifically relate to maybe causing or potentiating brain issues down the line?



Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Yeah. Absolutely. If you have gut inflammation, let's just say leaky gut for example, and what's gonna happen is you're gonna create this double whammy of malabsorption and inflammation. Okay and again the gut is an inflammation factory and is really good at making inflammation. These are cytokines and you can trigger neutrophils and macrophages to go, you know, fight the bad guys. So inflammation is not bad by the way inflammation is your body's attempt to clear out some pathogen right to protect you. But if that process being triggered excessively and it doesn't calm down readily then you're gonna have too much of that action going on which can start to damage your own tissue. Now you're gonna have tissue debris and now you have more things to mop up which triggers more inflammation.

Because inflammation is also the same process that used to mop up cellular debris from damage. So that's all the immune system's job. And it can start in the gut and leaky gut is one of the things I can promote this inflammatory response and then once you promote the inflammatory response then what happens you can actually create blood brain barrier breach because we know that the small intestinal tight junction protein? The cycle architecture of the small intestinal tight junction. It's the same as the blood brain barrier, which are the blood vessels that supply blood to the brain. Those endothelial cells, the blood vessel lining, have the same cycle architecture as the gut lining. They have actin, they have claudins and the tight junctions these proteins that kind of hold the cells together. So when you have antibodies by the way, when you have a leaky gut, how do we even measure it?

Like he got well we measure it by measuring antibody against these proteins in your small intestinal lining and because the similarity between the cycle architecture of these proteins that are found in the small intestinal lining and the blood brain barrier when you have antibody against Cesar Millan in the small intestine, that same antibody can attack the zombieland that's in your blood brain barrier. So then this is why when we have leaky gut or gut inflammation, we all you not always, but there maybe there's a pathway for getting brain inflammation as well. So it's important to know that not every single person with a leaky gut is going to have a leaky brain, but there's a pathway that leads to it and it can happen. So it all depends on the individual's how aggressive they are at doing the lifestyle things. What are the pre existing health conditions? If you are already diabetic or already inflamed, you already have high blood pressure, then you're the person that's gonna do worse when you have a leaky gut or have a concussion and things like that to suffer more consequences of that.



Jason Prall

Yeah, and correct me if I'm wrong, but my perception is that you know, while a lot can go wrong in the gut and we can have a lot of inflammatory gut ecosystem, there seems to be a little bit quick of a response or recovery at the gut level when we get things right versus when the brain starts to turn on fire and you get these glial cells and micro glial cells with inflammation sometimes that can just remain on and it can be hard to turn off right. So I mean that's that's one of the impact sometimes of that gut brain connection is when we start getting inflammation at that brain level then you know, it can take some real intervention and getting things very correct in order to sort of calm that inflammation down,

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

I would say. That's correct. And because you know, your gut lining turn those over every two or three days, you know, intestinal epithelial cells renew itself every two or three days and you're constantly putting food in there and constantly doing things. So I think that the response time in the gut may be faster in the brain specifically with micro glial cells when the micro glial cells become primed. So when you go through brain injury, your micro glial cells which are basically macrophages is a type of immune cell in the brain, the same as you have in the rest of the body called macrophage is like a big eater. But in the brain they just have, they look different, They have like big arms, right? The glia have like these arms and call it gamified processes. And these glial cells can actually, when they become inflamed and trigger, they can literally change their morphology or the shape into a type where it's constantly triggering inflammation. So literally, and for someone who has repeated concussion or brain inflammation, their micro glial cells can actually change into a shape and behave in a way that's kind of stuck on inflammation and it doesn't want to come off of that. And this is one of the reasons why it's so difficult for some people with brain issues to resolve these brain inflammation that they haven't.

Jason Prall

Yeah, I mean, it's I've seen a couple of these cases where sort of this micro glial priming occurs and it's, you know, it's chronic anxiety, it's difficulty sleeping. The smallest triggers can just really exacerbate a response, right? And I really feel for these people because it's a really challenging situation to get a hold of. But Dr. Kan, there's aspects of the gut ecosystem that I'd love for you to touch on with regard to the immune system specifically, because this is where some people say, a majority of our immune system is housed, right? But there's an intimate relationship with the gut ecosystem and the immune aspects of the guts. Maybe you can talk to me a little bit about that. Why that's such an important uh directional relationship, bi directional relationship.



Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Right, Because the microbiome that's what we're kind of referring to hear that the gut ecosystem I mean it's throughout the entire gut by the way and throughout the entire G. I. Tract. And the G. I. Tract starts in the mouth. Right? So you have the oral microbiome, you have the the gut microbiome all throughout the G. I. Tract. So it's not that you know in your small intestine saying that duodenum the midsection of small intestine that you have zero bacteria, you just have a lot less. You have a lot more bacteria that are supposed to be there in the large intestine in the colon. That's usually where these microbiomes, most of them are residing in the colon. And because the gut is such a large surface area. Right? And then remember earlier I said the gut is an inflammation factory. And by default what that means the gut is the gut lining is a place for surveillance, right? Because to trigger inflammation, you first have to detect what you want to kill. First inflammation is your immune system way of killing a pathogen. So you have to first survey, right? Search and destroy. So you gotta have a searching function which is surveillance and then destroy a kill function. So you've got the entire G. I.

Tract from the mouth all the way down to the other end is lined with immune cells. You have immunity. S. I. G. A. Secretory I. G. A. Immunoglobulin A. You have a tonsils you have got associated lymphoid tissues so you have all these things that are part of the gut immune system. So I think if we're gonna talk about how God play a role in immune function we don't want to make it sound like just the beneficial bacteria. The bacteria flora in the gut is the only thing that's playing a role in immune function. Right? There's a lot of other things like the lymphoid tissues like you know the dendritic cells in the small intestinal lining immune cells in this throughout the entire gut that's play an important role. But certainly the microbiome the bacteria in the gut play a very important role and that basically what they do a lot of it is basically through competition. Right? There's scarce resources.

There's only so much food around. And so all these bacteria down there whether good or bad they all compete for the same amount of resources. So if you have a lot of beneficial bacteria you basically are crowding out the bad guy by competition for resources. So having a good amount of microbiomes that are supposed to be there in abundance helps to crowd out the pathogenic bacteria. And secondly these microbiomes play a very important role in sight all kinds and immune signaling right? So much of it is all done through signaling right? It's not that the bacteria is down there eating up the virus is that the bacteria down there is signaling and is causing these cytokines to release to help your body to be able to do its job better. It's already looking, searching and destroying everywhere not just in the gut throughout your tissue but when you have cytokines and make that communication more efficient. However the cytokines can also go the other way it can become too efficient and now you're triggering too much of an



inflammatory response. So I like to kind of liken the gut microbiome to what you want is balance right. People tend to think like oh if the microbiome is low so more is better right know what you want is balance in these beneficial bacteria. So it's not like just shouting like unlimited amount of probiotic it's gonna solve the problem right? Because there are over 1000 species and there's many more that's being discovered all the time and there's not a probiotic that you take that has like all these different 1000 species. Now if you do fecal transplant potentially. But remember everybody's microbiome is a unique fingerprint so that you can get somebody else's you know fecal matter their microbiome implanted into you but that's their fingerprint that's not your fingerprint right? Kind of like organ rejection, potentially it may not work for you. So this is why fecal transplant doesn't work across the board for everyone where it works, it's like, wow, miraculous, how does that work? But there's also times where it doesn't work.

I know this because I have a lot of clients in Europe and in England, actually, there's fecal transplant clinics where you can go and just pay cash and just get it done. And a lot of people come to me like, yeah, I've done that already three times actually, and it didn't work, so it doesn't mean that it never works, it just didn't work for that person. So what I'm saying is it can work, but it's not universal. So we have to always think about, okay, what's the backup plan? What's our contingency plan and when it doesn't work, why is there other pathways? There's other things that we can do? So we start to think long non linearly and flexibly, Then then we become okay with not knowing everything, but we know enough to make a change and to do something right to help people to make their own lifestyle change, because ultimately that's going to lead the most important thing they can do is the things that people do every day rather than a fancy pill that we can give them.

Jason Prall

Well, you lead into it. My next question exactly, Which is, okay, so we got all this information about the brain, the gut and immune system and how any one or multiple of these systems can dis regulate or reregulate the others. What do I do about this? You know obviously there's targeted clinical interventions that you work with specifically with each client, nope question. Right. But how do I think about this either from a lifestyle perspective, what are some things that I can do to help create more balanced function and harmony in these systems? And then if I've got some maybe known dysfunctions whether it's brain, gut or immune or otherwise, you know what are some tests or how can I go about investigating this deeper?

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Sure. Yeah. And I think it's important to say Jason that the lifestyle things or whatever intervention you choose to do a supplement or take on a specific diet before you do it. You want



to first identify what is the actual problem? Right. Because just doing something without even knowing what your problem is not helpful. You know a lot of people are like well you know I'm gonna just do low fat map and do a stable diet. Why? Because I think I have SIBO. Do you really? Are you sure? Right, let's find out. Right. Because a lot of people just suppose they have some problem and they're taking the supplement, doing some kind of you know intervention without actually knowing whether that's actually the problem. So they're doing things because it sounds like it's a problem but it's not and this is the reason I bring up the branding you got access because the symptoms can sound very similar, right? It can overlap Hashimoto's look like fibromyalgia look like line patient. They all have brain fog, they have inflammation. So which one is it? So it's important to know which one is it? Okay but how do I help people to do this? Is that I like them to follow like a road map roadmap meaning okay, there's a sequence to where there's certain things that are more important than others as far as setting up the foundations of health. Because if you do things out of sequence then you may not get there kind of like the password to your phone. You know if the password to your phone is 121234. You type in 4321.

Well heck it's the same numbers, the same number of numbers, it just in opposite order and guess what your phone doesn't unlock in your body. It kind of works that way. Okay so the perfect example would be this one of the first step in the road map that I look at to kind of identify. Where do we start? Right? A lot of times people with chronic condition with Brandon and I have brain you mean God, where do I start? Is it? Do I take a brain supplement? Do I take immune supplement? Do I take a supplement? The first place you start is actually looking at fuel delivery. Okay, fuel delivery means your ability to deliver fuel to your working tissues. Because if you can't deliver fuel, you can't produce mitochondria, you can produce ATP. You can't carry out the processes that will help you to make new tissue to detox to transport. Nothing works. So a lot of people are skipping the step and they go straight into I must have mercury issue because I have mercury amalgam. So I got to do a metal detox. Well maybe you do. Maybe you don't because if you have fuel delivery issues you do a detox.

This is how you set one, somebody up to feel crappy and potentially make them worse. Especially with a brain problem. You know if you make a brain problem worse, you're risking losing brain cells and brain cells or post my topic. They don't go through mitosis, They don't divide and make new brain cells. So if you lose brain cells at a faster clip than aging, then you're advancing that neurodegeneration. So we all protect brain cells at all costs. And doing aggressive detox without setting up the foundations of the body. Is basically asking for, you know, speeding up inflammation which can potentially be in the brain or in other places of the body. As far as fuel delivery. Let me just say this real quick. What I mean by fuel delivery is number one oxygen and number two blood glucose. That's what I mean by fuel delivery. Really I would include digestion



in that one because if you can't digest your food, you can't deliver nutrient or fuel to your body either. But oxygen and glucose is the most important thing. In fact, in functional neurology module number one, when I went to your function neurology school, first thing they teach you is like, hey neurons for them to survive requires two things fuel and activation and I add the third thing, no inflammation. So fuel is oxygen and glucose activation means you gotta use your brain, your brain has to be constantly be firing and the way you fire the brain is not just by thinking, but it's all by movement when you move your firing your brain appropriate reception. Right? So fuel and activation is the first thing we learned in functional neurology. So that's just how important it is, right?

But a lot of time in functional neurology in the past, the fuel was kind of like not really looked at because they didn't really work with nutrition, it was accepted that optimal, you know, delivery was happening right is right? But we can't accept we can't assume because if someone was anemic, they're gonna have low oxygen. We gotta fix that. Or the functional neurology rehab. The exercise we do to rehab The specific parliament will not work because the brain cells too tired and doesn't have fuel to be able to heal, right? So, so oxygen is important. So we look at anemia we'll look at blood pressure issues. We'll look at circulatory problems as a proxy to indicate whether there's an oxygen issue and obviously blood glucose pretty obvious. We look at blood sugar stability, whether you have hypoglycemia or insulin resistant, they're both bad because they're both are gonna impact your delivery of fuel too, not just your brain, but every single cell in your body. So, those are the things I look at first.

Jason Prall

Well this is really interesting because you know, I think blood glucose is some common awareness right now right. You know, we've got the continuous glucose monitors which are cool. We've got finger sticks, we can actually test our blood glucose fairly readily as a consumer population. And yet I think not only in the consumer population, in the general public but also even in the practitioner doctor world, I find that there's still an under appreciation for blood glucose and the importance of maintaining good blood glucose and not having it go all over the place. And no matter what disease you're looking at, no matter what dysfunction, improving blood glucose and keeping blood glucose as well as insulin as stable as possible. Good regulation is fun as fundamental as foundational, right? Like. Yeah. And it's wild how underappreciated it is. So I think that'- I love that. You start there, right? And you mentioned oxygen, right? Another thing that comes to mind when it comes to oxygen is breathing, right? And so we don't need any doctors, we don't need anything. This goes back to kind of our eastern talk at the beginning, but learning how to breathe properly, right? The pranayama is from the vedic culture. The Eastern cultures and and and and and circulating chi right? I mean qigong is a practice that I

have grown to love and it has to do with awareness and breath, right? And and and this is fundamental to all those traditional arts. So learning to breathe and incorporating some kind of breathing practice can be really, really helpful for these things. Right?

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Absolutely. So it comes down to identifying what is the actual problem and what's the biggest problem for that person and how do we set it up? So, doing the first things first, rather than jumping all over the place, doing everything. So, if someone who's very stressed and they have really shallow breathing and they have low O2 saturation, then yeah, breathing exercise will be absolutely the thing to do for them. But if this person was already a Yogi mastering the breathing every day and this person is breathing every day and vegetarian. It's very anemic. Guess where do you go? You look at the diet, okay maybe you're being too strict and you're not eating enough iron and this is why you're anemic. Then we fix that, not the breathing so that the solution is dependent on what the problem is.

I think there's so much emphasis on Jason out there in the you know, summit world and this information world, right? It's almost information overload. That people are looking for solutions rather than looking for identifying the problem. And what I really encourage our learners, people who are in our program to do, is to learn how to identify the problem first before you even take on any solution. Because once you identify the problem the solution comes it's easy once you know what the problem is, the solution is plenty. But the problem that the hard part is identifying the real issue and how to set up a process. So you're addressing it in a way that can untangle these issues.

Jason Prall

I love it and you're really teaching people how to think like an integrative functional practitioner right? Like that's really how what you're teaching them because even with something like SIBO right? Like when I learned that there was like six different causes of SIBO one being causing step from the brain issues and perhaps the migrating motor complex creating the environment for which SIBO can manifest. Well then all the SIBO treatments aren't going to resolve until I get that migrating motor complex and potentially the brain issue that's causing it resolved. Right? So again that only came through functional integrative training to be able to understand that there's all these mechanisms and so going about it in a precise way and developing a proper road map. I agree is fundamental and it's critical and even for those practitioners out there who maybe haven't been trained in this way you know, your roadmap is a fantastic way to go about something like this. So Dr. Kan, where can people find more of your work? I know you've got



some master classes, you've got a lot of great things out there and trainings, how can they find them?

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Yeah, thank you for giving me a chance to share. Yes, we have a brain immune gut master class and this master class where I get people like the 30,000 ft view of what we've been discussing but a little bit more detail. So that's a great primer on understanding brain and gut and how different parts of roadmap that I used to help to heal that. And I also have a pretty well stocked Youtube channel so people can just search on Youtube Dr. Peter Kan, ahead of Chinese guy will pop up pretty easy to narrow it down, so there's a lot of great videos there that's free resource for people. Our Facebook page is also pretty cool too, so find me on Facebook as well, connect with me on social media.

Jason Prall

Well, I will say, yeah, your YouTube channel is fantastic. I've taken a look at some of your videos and you do get into some great detail. Very good educational resource for anybody out there, whether they're practitioner or, or just in the general public looking to improve their health. So Dr. Kan, thank you so much for coming on and sharing us, sharing with us, your wisdom and your amazing insights into the brain immune Got access.

Peter Kan, DC, DACNB, FAAIM, CFMP, CGP

Thank you so much for having me, Jason.