Neurohepatic Coupling: Balancing ANS Activity to Support Detox Pathways

Dr. Eric Gordon, M.D. interviewing
Christopher Shade, Ph.D.

Dr. Eric Gordon:
Welcome to another edition of Mycotoxins and Chronic Illnesses. Today, I always say we have a lot of fun. I always managed to learn a lot and today's gonna be a special one for that. We have Dr. Christopher Shade with us. Dr. Shade has a PhD in Environmental Chemistry, and he is Founder and CEO of Quicksilver Scientific, and more importantly than being the founder, he's a man who continues to innovate and develop new products that are pretty amazing. He has a passion for healing and we've been talking and that you'll see that today and a really intuitive understanding of chemistry and biology and especially of how our body handles toxins. And he early on developed a special system for really being able to measure very low levels of mercury in the body.

And he has developed some products that I find very helpful to get rid of mercury. And he has done a lot of work at delivering lipid-based nutraceuticals. Nutraceuticals, which I think are again have been a big step forward in getting things into our bodies rather than just passing through our GI tracts. So today we're gonna talk about mycotoxins, but more importantly, how we get rid of them, how our body handles toxins in general, okay? And I think one of the most important issues that's often neglected or passed through too quickly, is the neuropathic coupling, okay? Cause we forget how important the brain and the liver and bile are. So, now I'm gonna shut up and let Dr. Shade tell us. First of all, yeah, I'd like to talk a little bit about your background. Actually, before we even get to the neuropathic

coupling, just tell us a little bit about you, how you got into environmental medicine and what really lit your fire.

Dr. Christopher Shade:
Well, kinda goes, you gotta go back to college and when you do or do not have that first awakening whether that's a Ethnobotanical or not and mine very much was. And I was a pretty reductionist guy in college. And I wasn't very excited. I was doing Environmental Chemistry. Found it pretty boring. So, I was more excited about growing organic marijuana in my closet and trying psychedelics and I had this sort of awakening at the time and it moved me away from science. I became an organic farmer. I left school and I was so into like growing this Organic Biodynamic Cannabis that I was like, I'm just gonna do vegetables. I'm just gonna make this my life. And so, I took this shot at Regenerative Agriculture and it was a little early, I got to, I learned and then I got some land. I was organic certified back when it meant something. I used Biodynamics.

And I joked that I left farming the year that whole foods came around there was no money. I spent a lot of time doing that and then I went and I did an internship at the Rodale Institute where all the first trials to show that organic farming was economically viable, they're all done there. So I started learning, going back into the science side. So I was more of an alchemist as a alchemists wizard, as a farmer then coming back into agricultural science and then I was gonna get married. So I had to go back to graduate school and start making some money. And I went in the chemistry of pollution around agriculture. And then I did my master's and I did my PhD.

And then I started finding that really boring 'cause they weren't doing anything really innovative and when I interviewed for my PhD, they were showing me to different professors and they had this one professor who was kinda, he was crazy in his own. Like he was wild, but he was the smartest guy in the whole building by far, but he couldn't keep a graduate student. He couldn't get a paper done 'cause he was such a perfectionist. And he asked me a couple of questions that were like mind blows right away. And he goes, are you good in the lab? And I'm like, yeah, I'm great because I need a Methylmercury analyzed and

separated from inorganic mercury, it's called speciation. Can you do it? I'm like, absolutely. Speciation you said? And so I just signed on. He had built like global carbon cycling models that are used all over the place in global mercury cycling models and look up the cycle of mercury, You're gonna see this picture of a lake with a factory on one side, the guy fishing on the other and a fish in it and mercury raining down. That was all his, everybody just copied on that.

Dr. Eric Gordon:
Wow, I've seen that picture for years. He did all the original stuff on that.

Dr. Christopher Shade:
And in cycling, he did the early papers on cycling of iron in the oceans. How phytoplankton get iron, they gotta release little molecules to get it. And they'll never have any hope of getting that molecule back. And so they release a molecule that grabs an iron and it floats over to the next phytoplankton and he takes it. So they all have to work together. And they're called Sideral Forte.

Dr. Eric Gordon:
Yes.

Dr. Christopher Shade:
And developing of all the ideas around Sideral Fortes at MIT at the time, but he couldn't get anything done and so, he was now at the University of Illinois in the Ag School. And so he put me with him and I developed, I learned how to freaking ton. He was like, nobody talked to such a high level and he was so ADD, but I could handle ADD and so I developed and patented this technology for separating the different forms of mercury. Then I took the patent started the company here doing environmental, then I went into clinical. My first two guys that I worked with doing mercury measurements were Hal Huggins and Dietrich Klinghardt. They were my first--

Dr. Eric Gordon:
Okay.

Dr. Christopher Shade:
It was a great way to start and everything went from there. I offered the test. I offered the Binder-IMD that like takes all the mercury in the gut and then I started developing the liposomes 'cause I had to get it in glutathione into the system and then everything else was built on the liposomal technology. And along the way I kept learning more and more about how detox actually works in the body and how liver's connecting the brain, connecting to immune system and I stopped thinking about mercury.

As this one thing and we started talking like you and I have been talking about chronic disease as this global breakdown and the things that come from that. And what are the main systems that get shut down or reversed and how can we get those directionally moving the right way. And this neuropathic coupling, is that that's the biggest link that gets reversed and that you can affect to straighten it back out and has the most effect on normalizing everything else.

Dr. Eric Gordon:
I love it, I love it. So, let's just start there. I mean, that's kind of what's in my mind, it's almost starting at the end, but 'cause I said it's what excites me the most to hear, but let's go for it. Start there and then we'll backfill what we need. Like the neuro hepatic coupling is, you know... I'll let you go. I'll use you.

Dr. Christopher Shade:
So what is neuropathic coupling? All right, so let's start with just an overview quick of detox from the cell to the toilet. So, now the toxins are either gonna be in the cells or somewhere around them in the system, but say they're in the cell. We need to go through these phases of detox, phase one, two and three.
One, you take a toxin and you have to kinda turn it into a free radical. You're gonna clip a little piece off of it. You're gonna make it reactive. Now for metals, you don't need to do that, but for mycotoxins and pesticides and herbicides, generally need to do that. And then in phase two, you're gonna clip on one of your molecules, glutathione, glucuronic acid or sulphate. Sometimes the menthol group and that's gonna make this anionic that means

negatively charged grouping that's recognizable by phase three. Phase three is transport. This is the biggest one that we missed for so many freaking years. It used to all be phase one and phase two, hepatic detox. Well, these things happen everywhere. It's just all these reactions happen everywhere. It's just, if there's four copies of the mechanism in a thyroid cell, there's 50 copies in the liver. So, the cells you've got phase one, phase two. Now phase three is the transport. So that's a transmembrane transporter that uses ATP and magnesium to take that toxin conjugate and dump it out of the cell. So you process the toxin, dump it out of the cell It's gonna go into the matrix into the lymph then into the blood. So you've got cell born stuff becoming then bloodborne toxins. So now it's circulating and now you gotta get it out.

And I'll often call microcosmic and macrocosmic detox. Microcosmic is the cell pushing away, pushing away. Now it's circulating. Now we gotta drain it. We got liver and kidney to drain it. We're gonna talk about liver 'cause it's the most important. And so it has a phase three transporter that takes that conjugate from the blood into the liver cell. So now we think on a liver cell level. Inside the liver, every cell looks about the same. One side has blood feeding stuff in. One side has bile draining stuff out. Now, there's also doors that dump from the liver back into the blood when they need to, but you don't want this to happen. Okay, there are some exceptions where you want that to happen, but, in the general model of detox, toxins are coming into the hepatocytes. They've either already been conjugated or they're raw, they've come from breathing or from food and portal circulation and then they need those phases in the cell.

So the cell either brings in a conjugated one or brings in a raw one and conjugates it and then dumps it into the bile. That's how the toxins get out and then the bile drains down. All these little bile rootlets draining down into the common bile duct. You've got the gallbladder and then down into the GI. And people talk about extrahepatic cholestasis. Like a blocked bile duct or a blocked gallbladder. But intrahepatic cholestasis, is where the neuropathic connection is. Intrahepatic means the transporter moving from inside the cell into that little bile canaliculus the bile rootlet. And you have two things pumping bile. One is called bile export pump, cool, that makes sense. The other one is called MRP2, which is the

phase three transporters that's dumping toxins into the bile and dumping bile. So it does both. Now the transporter at the cell membrane is called MRP1, MRP2 is down dumping into the bile. So those guys are going together. And the other thing that's feeding it in and keeping everything liquified and moving and protected is the MDR, which pumps PC, Phosphatidyl Choline in. So we need those transporters working. We need the supply of PC all the time to keep that flowing. That's why PC is so big in this whole process. All right, so when as long as that's happening and toxins are going in and going out, that's cool. Everything's good.

The other thing that's going in all the time is bile salts. So bile salts that go to the GI and aren't used go all the way down to the large intestine and then you have these transporters, NTCBs, I think and they pull them into the blood. They circulate over the liver and the NTCB is in the liver to go going into the hepatocyte and it's bringing bile in. So you have toxins and bile accumulating in the cell and then draining into the bile flow, into the bile tree. Everything's working well. Everything's cool. Now, what happens is that transport into the bile gets blocked and when it gets blocked, all of a sudden bile and toxins are building up and there's inflammation building up and that's blocking phase two, so you got a lot of phase one--

Dr. Eric Gordon:
Just to clarify, so you're saying normally the intrahepatic circulation is doing really nice 'cause it's expensive. Bile is a very expensive thing to make. So we like to try to salvage what we can and suck it back in. But you're saying that sometimes when that gets reabsorbed with a toxin on, it gets stuck back in the liver.

Dr. Christopher Shade:
No, let's separate those. People talk about toxins being stuck to the bile salt. I think just pretend that that doesn't happen.

Dr. Eric Gordon:
Okay.

Dr. Christopher Shade:
I'm gonna paint the same picture, but I'm not gonna connect those.

Dr. Eric Gordon:
Okay.

Dr. Christopher Shade:
The toxin is part of the bile, but I did just say that the bile transport and the toxin transport are unified.

Dr. Eric Gordon:
Okay, okay, I missed that point, thank you.

Dr. Christopher Shade:
Right, So, and I didn't totally say that the BSEP, the bile salt export pump and MRP2 are co located on the canalicular membrane, all the time. They're right next to each other. And they're co-regulated the upregulate--

Dr. Eric Gordon:
That's the bile canaliculi, okay, the small--

Dr. Christopher Shade:
Yeah, so the bile drains from the hepatocyte. We're in the hepatocyte where the bile and toxins go out. The transporters for them. There's two transporters that are like twins and they upregulate, downregulate together. They're always located together under severe cellular stress. They actually internalize into the cell together. They work together, which means, toxin transport and bile transport are intimately and inseparably linked.

Dr. Eric Gordon:
Okay.

Dr. Christopher Shade:
Now they also--

Dr. Eric Gordon:
So--

Dr. Christopher Shade:
Imagine you're not moving them out. Then they're building up in the cell and they both have a deleterious effect on the hepatocytes. One is toxicosis from having the toxins built up and free radical generation from the toxins, but the bile salts, you can't just saturate yourself in bile salts. What are bile salts? Detergents.

Dr. Eric Gordon:
Right.

Dr. Christopher Shade:
Therefore emulsifier in your fats. And so they will dissolve the whole damn cell. And so you have a pressure relief mechanism and it's a transporter for toxins and a transporter for bile salts that go from the hepatocytes back into the blood. So on the blood cell side, you want everything coming in, but if it builds up too much you're gonna destroy the liver. It has to dump everything back into the blood.

Dr. Eric Gordon:
Okay, yeah, keep going. This is great, I'm learning.

Dr. Christopher Shade:
Yeah, this is really big. When I saw this, I'm like, this is huge. This just explains everything in toxicosis world. So, when the drainage in the bile canalicular gets blocked, the cell fills up with toxins and bile and it dumps it back into the blood.

Dr. Eric Gordon:
Okay.

Dr. Christopher Shade:
So this is when people do detoxes and have all these damn symptoms. They start mobilizing stuff out of the tissues. It gets to the liver and the liver says, fuck you.

Dr. Eric Gordon:
Yeah.

Dr. Christopher Shade:
Pumps everything back into the blood and you get lower back pain because then you saturate what's it gonna do. The kidneys try to keep up then you blow out the kidneys 'cause the same things that blow out the liver, blow out the kidneys 'cause it's the same transporters.

And then they start coming through the skin and you get the itching. That's actually bile salts under the skin and that'll precede actual rashes coming out when the toxins are coming out and you're have immunological reactions to the toxins. You have the rash. So any itching, upper right quadrant pain, lower back pain, rashes is usually the blocked liver dumping everything back into the blood.

Dr. Eric Gordon:
Wow, okay, I'm embarrassed. I've been doing this for a long, long time and I didn't really understand that it was that combination of the bile and the toxins. I mean, that they just co transported. I always thought that it was mixed that they were connected to the toxin and that was the intrahepatic circulation, but this. How did I miss that?

Dr. Christopher Shade:
They're just co regulated and that's why the symphonology's. They go together and there's toxin bile, it's like, well, your bile and your toxins that your bile has a lot of toxins. This is what it is. The bile salts are still bile salts.

Dr. Eric Gordon:
Right, right.

Dr. Christopher Shade:
And so, somebody connected those two and that's what happened. Might've been shoemaker. But that's actually what happens is they are co-regulated. And so, now we get into the neuropathic connection. Why does that transport at the back get blocked? Now the most simple chemical explanation, inflammation blocks up all of that. And the biggest inflammaging that we have in these patients is endotoxin. Now toxins will do that. All these things will do that, but the prototype for it all is endotoxin, which comes in and winds up inflammation and blocks all these things. Now, and this brings up a bigger, the inflammation blocks detoxification, but why is that?

Now, it's because of the antioxidant, oxidant pull that those two processes are. And the detoxification is fundamentally an antioxidant procedure. It plays in the antioxidant field with glutathione, NADPH, all of your different antioxidants. Those all worked. That system all works together. And there's sort of master gene control and turn it up and down is NRF2. So, detox is antioxidant. Inflammation on the other hand, you've got some infection and your white blood cells are running into the game with big sacks of peroxide and a hydroxyl radical, hypochlorous acid. They're making pro-oxidants. And so there's this unnecessary downregulation of antioxidant activity and hence detoxification when inflammation has come to the full.

Dr. Eric Gordon:
Yeah. I like to think it was also just using up a lot of those antioxidants very quickly when we get inflammation going.

Dr. Christopher Shade:
That is true as well. So there is a drain on the system, but there's also downregulation of genes to make these things. So you got both of those things going on at the same time and for free radical activity, you can catalytically cycle glutathione, but for toxins you're binding and draining.

Dr. Eric Gordon:
Yeah, you're losing it. Yeah, you lose it.

Dr. Christopher Shade:
So you're losing it during that system. All right. So, inflammation is a big blocker of that whole thing, but what else is a big blocker? And we'll see that the endotoxin can work on blocking it both at a chemical level and at a neurological level. Because if you look at a hormone, what hormone blocks it? Estrogen. So when you're estrogen dominant, this is why you have that cholestasis of pregnancy during those estrogen spikes. So estrogen blocks it, but estrogen, how does that work on the brain? It activates a glutamate receptor activity. And that's why estrogen dominance makes you anxious, irritable and bitchy. Whereas progesterone works opposite. So progesterone in the brain works on GABA receptor activity. It makes metabolites that are GABA agonists.

So that's why progesterone immediately sets that right and calms you down when you're estrogen dominant. But in the liver, like and you taste progesterone, it's the most bitter of the hormones and bitters all open up flow and it works beautifully to open up that liver flow. So, we see from the hormone link to the brain, it's working on a glutamate receptor level, but what else blocks the movement of the bile? Stress. But why stress? Because glutamate activity, anything that gets you excess glutamate activity in the parasympathetic domain makes you excess sympathetic. Anything that's doing GABA activities is making you more parasympathetic. So sympathetic activity is what fight or flight. Parasympathetic is rest, digest, repair, regenerate, detoxify.

All of those are parasympathetic activities. So if anything is making you just dominantly sympathetic, you know, either, from a perceptional standpoint or from chronically working on your glutamate receptors, those two go together. So all of a sudden you start sensing fear in everything all the time. And if you've got to run, you're not digesting, you're not detoxifying. So anything on neurological activity that's making you either on the autonomic sympathetic or on the chemical neurotransmitter side, more glutamate dominant then that's going to block detoxification. And what are those things that hit that? Mercury hits

that, mold toxins hit that, a number of things do. But then, you look at this broader activity of neuroinflammation where the microglia, the immune cells in play. They're supposed to be doing neuroplasticity are now releasing pro-inflammatory mediators. They attack the glutamate receptors on the neuron and the neuron releases other mediators which reactivate the microglia. So that's called neuroinflammation. It just keeps going until you tamp it down. You either got to calm the microglia or calm the glutamate receptors to slow that all down once that starts running.

So how do we activate microglia? Endotoxin, one of the biggest activators, a number of different pesticides and herbicides, amyloid plaques, but it doesn't matter which side you started from, you can just get that thing rolling. So then, you'd look at these toxins, like mycotoxins, they're really good at activating that, but especially in somebody who's already down to a degree that they got some leaky gut, they've got periodontitis. The immune system has already gone through that Th2 shift and it's like not killing things, it's just reacting to everything. And then every barrier is open and flamogens are everywhere. And this thing's all jacked up and this thing's all blocked and you're kinda fucked at that point.

Dr. Eric Gordon:
It is the cycle, the downward cycle. The good part, is that this is a system and the difference between linear machines and people is that we have our counter failing forces. I mean, 'cause everything in the body like you say, is in cycles. So it's designed for countervailing winds to always be appearing. You don't go all one way until you're really pushed to the edge. So I mean, that's what saves us.

Dr. Christopher Shade:
And you've heard about all this things and in train all that, once everything's turning this way, everything kind of in trains into that, but it's trying to hold itself up and you can turn a couple of these main sales and other things will in train back around it. And you can work on the brain and the neurotransmitter landscape, the neuroinflammation, and you can work on the liver and you can get that bile flow up and you can get binders in there. And that's the simple tools that can shift everything while you're looking for, you know, what is the creature

that's in there? What is the main toxin that's in there? And where you can work a little more specifically.

Dr. Eric Gordon:
Yeah and just to always remind people how the wisdom of the body is that even just things like with estrogen, but when estrogen is metabolized. Well, if there's enough iodine and things are working, you also make estradiol. Estriol interestingly enough is the end product of estrogen metabolism. Quiets down the microglia, quiets down brain inflammation. I mean, we actually use it in MS and in head trauma. Again, it's that the world of neurosteroids is incredibly complex in my mind.

And you just cause you see with progesterone, most people, it's very relaxing. It goes to one of the pregnenolone derivatives that just relaxes the brain. But then there's a small percentage of women who it makes them cry. I don't know what the percentage is, but it's a small percent. I've never really figured out the whole story, but you know, so it's just the dynamics of the body are just amazing because there's compensations that are set in there to always bring us back to something close to a homeostasis. So homeostasis is a bad idea because homeostasis is kind of death, there's no movement. We need the movement.

Dr. Christopher Shade:
Dynamic homeostasis.

Dr. Eric Gordon:
Yeah, right. Yeah, we need to keep moving. And so let me just go back 'cause you just gave us a fire hose and I loved it, I loved it, but let me just I think what's the phrase now? Unpack that a little bit. Okay, so, 'cause you pointed out some really important pieces that when the gut is inflamed and once the guts inflamed for whatever reason and there's almost always bacterial overgrowth, whether it's upper or lower or bacterial imbalance, especially if it's lower. You start having inflammatory chemicals, the most obvious ones like the LiLy bulb polysaccharides as we all think about, but those are starting to create inflammation and those are going right to the brain and that's to the brain, excuse me, right to the liver.

Dr. Christopher Shade:
And to the brain.

Dr. Eric Gordon:
And they're gonna get to the brain, yeah. But when they get to the liver and they started causing inflammation there. If that liver cell is also dealing with other toxins at the same time. Can the toxin load.. Talk a little bit more about the co-regulation if you will, this is more for me. Hopefully the audience will enjoy it as well. The co-regulation of toxins and bile because I thought and correct me if I'm wrong. I thought one of the ways we get rid of many of the hormones I thought were bound to some of the bile acids and I think that's why we all might picture was that the toxins were bound to the bile acids. But really what you're saying is that they're they're flowing together in the same stream.

Dr. Christopher Shade:
Yes.

Dr. Eric Gordon:
So talk a little bit about that.

Dr. Christopher Shade:
Yeah. So, phase 1, 2, 3. 1, you activate the toxin or in this case, the hormone. So you're making a more reactive hormone and then in phase two, you're going to clip a compound onto it. Glutathione, glucuronic acid or sulfate with estrogen, say it's glucuronic acid.

Dr. Eric Gordon:
That's right.

Dr. Christopher Shade:
Now that makes it into an anion. It doesn't need to bind on to an albumin or some carrier molecule. It's free to circulate now on its own. And, so then, it needs to be dumped out of the system by the liver and the liver is gonna dump it through this transporter, MRP2. MRP2

moves toxins and bile and MRP2s twin sister is BSEP, bile salt export pump and BSEP and MRP2, they are twins together. They are separate transporters, but they upregulate and they downregulate together. They're always located right next to each other in the canalicular membrane. The membrane dumping out of the liver into the bile tree. So when you block, they're blocked together, upregulated together and so when you block bile flow, you're blocking toxin flow.

When you block toxin flow, you're blocking bile flow. They get blocked together. All that accumulates together, dumps into the blood, circulates, makes problems. When you get it to flow, they are flowing together. The toxins and the bile are flowing together and so the bile comes and the toxins come and people just thought that the bile was binding the toxins.

Dr. Eric Gordon:
Right. Because a lot of the things that we use to detoxify often will also bind bile.

Dr. Christopher Shade:
Yes.

Dr. Eric Gordon:
That's where I got confused, I think, but really it's just because they're both negatively charged--

Dr. Christopher Shade:
Yeah, the bile salts are negatively charged and the toxins are negatively charged and they stick to the anion and exchange resins. Whereas you decouple that when you use IMD or silica with the sulfhydryl groups because that is not an ion exchange binding that's a covalent binding between the sulfhydryl groups and the metal. And so there you grab metals out of intrahepatic circulation, but not bile.

Dr. Eric Gordon:
Yeah and I just wanna recommend that the IMD is a great place to start and to continue with patients with mercury issues 'cause you can use it as such tiny doses that you can find the level that won't make people sicker. 'Cause that's always a big issue moving mercury and what's great is tiny, tiny dose, you can usually get away with it.

Dr. Christopher Shade:
Yeah.

Dr. Eric Gordon:
- But thank you, again, I'm a little embarrassed, I don't know if it was my misapprehension, it's funny how you can do this for such.. you think you know the science and like you make a leap and it stays in the back of your brain for a long time. So that is..

Dr. Christopher Shade:
A lot of people were saying that, all the toxic bile and stuff and I'm like, wait, no. Same thing, they go together, but not for the reason you thought, and it's good to know specifically why.

Dr. Eric Gordon:
Yeah, no, it's very helpful. Very, very helpful. Yeah, if were thinking about this. Okay, so we got that. So basically, I got that Hope everybody listening is that, so your bile and your toxins are moving, they're swimming together.

Dr. Christopher Shade:
Yes.

Dr. Eric Gordon:
Okay and the transport mechanisms are closely linked. They dance together. When one shuts down, the other one tends to shut down as well it sounds like.

Dr. Christopher Shade:
Yeah, yeah.

Dr. Eric Gordon:
Yeah. So that's what gets you into trouble. Okay and then what happens as far the toxins? Again, it's when we have the leaky brain and just toxins getting to the brain, but I guess your point is once you get inflammation going, you're gonna start affecting your brain and start having inflammation and that's gonna feed back--

Dr. Christopher Shade:
brain barrier and then the toxins are gonna get there. So, you've shut down the liver. You're dumping toxins out of the liver, into the blood, instead of dumping into the bile. And the same thing that was shutting down your liver was starting to open up your blood brain barrier. All that stuff comes out of the liver, increases the load, and it gets into the brain. You start winding up neuroinflammation from the toxin and endotoxin load in the brain that's reinforcing this problem here and you're just sort of stuck in this pattern and you need them. You need to calm this and release. You calm the brain, release the liver.

Dr. Eric Gordon:
Right, right, right, yeah.. 'Cause as the data seems to be accumulating, leaky gut is going to increase your likelihood of leaky brain.

Dr. Christopher Shade:
And any endotoxin source. Yeah, UTI's have been known for a long time, but one of the ones that people missed was periodontitis. There's great papers on periodontitis and endotoxemia, periodontitis and cardiovascular disease, periodontitis and depression. All those are inflammatory disorders from endotoxemia. So the teeth are a big way to attack this.

Whenever you have this whole system going on, your immune system is gonna be all fucked up too and so you probably aren't controlling the microbiome in your mouth and you probably have periodontitis. So water picking, brushing your teeth with artemisinin or biocidin, or just really taking care of the oral periodontal space with anti-microbials and anti-inflammatories while you're treating all this other stuff.

Dr. Eric Gordon:
Yeah, because one of the things that we've talked on on some of these other lectures that we've been doing or discussions have been around the idea of the connective tissue because that's huge. And anytime you have inflammation, cause I mean, a lot of peri death and periodontal disease, I really think is also a reflection of an issue with connective tissue. It's one of those areas that there's a lot happening. So yeah, the oral and we've talked to a few folks about that. The oral chronic dental infection is a great source of low level persistent inflammation which is gonna light up everything.

Dr. Christopher Shade:
All right. So a lot of people brushing with vitamin C. They'll do lipids MLC and brush with that have a big result because there you're feeding the connective tissue.

Dr. Eric Gordon:
Yeah, yeah, yeah, yeah vitamin C and proline very important for our connective tissue. And so, how do you think we should be looking at helping people detox mycotoxins? Is there a particular--

Dr. Christopher Shade:
That's why we set up all this neuropathic thing because the mycotoxins are really good at that. They're really good at knocking out bile flow, shutting down liver. They post translationally depress NRF2. That means you can either block the production of NRF2 by blocking the gene transcription. But after you've even transcribed it, they're blocking its activity. So they're shutting down detox very effectively and they very effectively wind up neuroinflammation.

So they create this whole system and then it makes it very hard to detox apply. So just talking about these two sides of it, we need bile flow. We need binders and we need neurological calm down. And so, on the liver side, we use bitters. We put bitters into a liposome. We have Bitters No. 9 which is a little better for your stomach and Bitter X, which is better for stuck bile flow. So we use that and PC. Remember the PC is always being

Phosphatidyl Choline and is always being donated from the hepatocyte membranes into the bile flow. In fact, if you're choline deficient and this whole TMAO red herring thing, like go down that line. That is a bad idea. It's the TMAO in the blood is more reflective of a microbiome problem not a choline access. 'Cause as soon as you're short on choline in the liver, you go cholestatic immediately and what do we do then? Then you lock out all the bile flow.

Dr. Eric Gordon:
Yeah. Just to say choline is so important to people. I mean, like all this. We have so much of the non-alcoholic liver disease now.

Dr. Christopher Shade:
Yes.

Dr. Eric Gordon:
And choline deficiency, after you've gotten rid of your sugars is a big thing for people to remember, yes and I do agree. I think that TMAO stuff is overdone.

Dr. Christopher Shade:
Yeah. And so PC is always being donated and keeping it flowing. So we give PC and bitters and that's the basis of making all that stuff flow. Other stuff on top of that, milk thistle also insures. So one of the things when that inflammation and a high toxin load in the liver often those transporters throw in the towel and they get wrapped in a little liposome and internalized into the cell. The milk thistle makes them stay in place, whips them a little bit and get the load down. That's one of the ways that milk thistles protect. It's ensuring the bile flow continues. So--

Dr. Eric Gordon:
That's fascinating. I love when people have done deep dives on the functioning of the natural, of the herbals. You know, it is so interesting to see, like how they dance in so many ways.

Dr. Christopher Shade:
Yeah, I guess, it got a list of things. Works on liver What do we need to accomplish here? All right. So those for keeping the bile flow going, and then binders to bind everything that goes down there. And, we have this stuff called ultra binder that's a blend of charcoal. which is like a well coal, but natural well coal. And zeolite along with IMD, our metal binder and some KC gum oleo. So that's a cocktail there 'cause each one--

Dr. Eric Gordon:
I like it.

Dr. Christopher Shade:
Grabs a swath of the chemical soup of toxins out there. Or if you did go in prescription, you've got cold histamine, if you just want a one hit wonder, probably be charcoal, but you need some sort of binder down there. So liver flow and binder. But if you don't settle the neurology, you're gonna be working upstream the whole time.

Dr. Eric Gordon:
Yeah.

Dr. Christopher Shade:
My favorite--

Dr. Eric Gordon:
let's talk more, I mean 'cause I think a lot of people miss, I always say, I mean, the brain controls. Yeah, the brain is the final controller. I'm not talking about the thinking part of the brain.

Dr. Christopher Shade:
No.

Dr. Eric Gordon:
That's coming along for the ride and often misdirecting us, but the basic, the brainstem, I mean, the parts of the autonomic system, I mean that really orchestrates our immune response. So, how are you looking to help orchestrate?

Dr. Christopher Shade:
It's prioritizing, right? And if you're sympathetic dominant in all the time, it will prioritize your biochemistry away from these luxuries of cleanup and regeneration. That's why stress ages you and kills you. Very simple, very, very simple. Are you fight or flight or you're rest, digest, repair, regenerate, detoxify. So in the neurology, we gotta get people more parasympathetic and there's chemical things and there's lifestyle things. And on the chemical end, CBD is probably the best thing that we have. And I first found it, it's almost 10 years ago now, maybe nine and started applying it to autism. Now in autism, you probably worked with some of those.

You wanna start detoxing an autistic kid. First you say, the word of the supplement you wanna use. And you do that for about six months. Then you show them a model for six months. Then you make a homeopathic for three years. Then you put a molecule into the homeopathic. It takes about 20 years. And the kids grown out of it or whatever by then. And that's because the neurology was just down there, they're glutamate receptors are all jacked and they're all over on that side and you put something in and they go farther over there, shuts everything down. They have a terrible reaction that comes to their skin. They have diarrhea. Everything's crazy.

But if you gave them CBD first, all of a sudden you could give him like adult doses of your best thing. It was like, oh my God. And I'd first tried this with GABA, with lying people. 'cause they have the same thing. Here, try this. I heard. And it's just the neuro immune system goes nutsy, the immune or the brain, they're so linked. They go crazy. And I saw, you give them GABA first. Now I can give them detox stuff without him flipping out. Now I thought that meant that was all in the brain, but it turns out there's GABA receptors on the immune cells too. Or then later I got into CBD and CBD is working. So you've got GABA glutamate

balance. CBD is more pushing down glutamate excess and stopping the microglia activation. So it stops that neuro inflammation and that's allowing GABA to shine more. So you can use them both really. There's cannabinoid receptors on the immune cells and GABA receptors on the immune cells. So I tend to use a blend of GABA and CBD and that they calm down. The glutamate receptors stops being so hyperactive and the autonomic settle and go over more parasympathetic and that allows the liver to open, allows the cells to release toxins. Allows you to go to the bathroom. Allows everything to start functioning again. And so that's really, it's that blend of the brain and the liver's really start bringing them back down into normalcy.

Dr. Eric Gordon:
Yeah, no, that's the dance. I mean, it really is. I mean like, this is what, the whole, I'm a big proponent of Dr. Navios, the cell danger response thing. And basically that's what he saw, is that when he blocked the pure andrenergic receptors for autistic kids, which is very similar because they're the danger signal or the essential dangerous signal and the glutamate is kind of the next step. That's the extracellular, or the intracellular danger signal writ large, yeah. And that same thing the autistic kids, have the best response because the system is still fresh and they're on some level chronic fatigue has a very similar we think physiology to autism. It's just that it's occurring when the brain is finished developing. So the expression is much, much different.

Dr. Christopher Shade:
Yeah, not so much neurological dysregulation on a cognitive level.

Dr. Eric Gordon:
Right, exactly. It's the autonomic system. So it makes it carriable Right, but the cognitive system is developed, so you just get brain fog and fatigue, but you're not usually, banging your head or throwing tantrums. You don't have the energy for that. That's the other thing. There's the energy production of the whole system has chilled quite a bit with adults, but

some that you really find that the CBD has been a very, very big component of what you've done over the last--

Dr. Christopher Shade:
It's a game changer for autism, mold, Lyme. Those ones where neuroinflammation is a huge part of locking them into step. Let me throw another one that's a big game changer in getting the liver to work and calming down the immune system. And that's DIM.

Dr. Eric Gordon:
Okay.

Dr. Christopher Shade:
Nano particle DIM. And first thing that I noticed was, it was removing food allergies. So GI food response, it's huge on. Why is that? We thought it just depicts estrogen stuff. Well no--

Dr. Eric Gordon:
Let's just remind people that it's dying endomethane. And again, it's something we've always used to help people deal with excess estrogen or metabolism of estrogen.

Dr. Christopher Shade:
Yeah. And giving you better non-cancerous metabolites estrogen.

Dr. Eric Gordon:
Yeah.

Dr. Christopher Shade:
Well, guess what? It is a big immuno tolerance thing. So it switches from a Th2, Th17 dominance to T regulatory dominance. And I was taking it as part, I was building it for a hormone system I was making. And I was like, why are my food allergies going away? Why do I feel better every freaking day? And it's that. And it's been that that data was shown in different models of IBS and where it was this immune dysregulation and in NASH, in liver

inflammation, it flips it from that as part of the generation of alcoholic. And then a fibrotic liver is this runaway immune flip into this pro-inflammatory wing Th2 and Th17. And it's not where you used to Th1 versus two, but this pulls it into T regulatory dominance, which is one of the things you're trying to do with probiotics. It's what probiotics do when you grow up with your food, is it teaches you tolerance to foods.

And so it encourages that tolerance while at the same time increasing the immune system, some of it's antiviral activity and at the same time having epigenetic effects on NRF2 making NRF2 more available when it's been shut down. So in mold people where NRF2 seems blocked and the liver DIM has been a magic show for opening that back up.

Dr. Eric Gordon:
That is fascinating. We use so many things and we approach them in our thinking as though they're as drugs, but even drugs have that same capacity to surprise us with how many other pathways?

Dr. Christopher Shade:
Yeah.

Dr. Eric Gordon:
Are interrelated, I mean, we just always make that mistake of thinking that this system only has one directional lanes and there's nothing like that.

Dr. Christopher Shade:
Or like drugs ivermectin is for a worm. Look, it works on a virus too, cool.

Dr. Eric Gordon:
Yeah, I know that's been the biggest joke 'cause we've used ivermectin for probably, I don't know, 18, 20 years. But, we thought we were treating parasites but people would say, like all these symptoms would get better sometimes. And I go, like, it doesn't sound like you--

And this is another one of these things of like, why I just wish we had the ability to.. The time in life to every time we hit a question to always be able to go back and like go deep. Because if I had gone back to really look at the basic literature ivermectin, but the thing is in before COVID you couldn't, its effect on the immunology was there, but it was very deep.

And you only first saw its effects on chloride channels. I mean, that was all people talk about, but anyway, I don't wanna digress too far, but that is it's so wonderful when we have folks like you who have the scientific background and the chance and the opportunity to keep going deep for us and bringing back how these things really work.

Dr. Christopher Shade:
Yeah.

Dr. Eric Gordon:
You know.

Dr. Christopher Shade:
We use them in different scenarios.

Dr. Eric Gordon:
Yeah.

Dr. Christopher Shade:
And I like, what we're trying to do here is create a more universalist. Everybody's into individualization right now. But you know, we are humans. There's not so many different ways that things work, but I want a pretty universal is core to our protocols when we approach this, brain, liver binder, here are the things you can use. Here are the things we like to use. Let's get that all going. And then we can pick out the individual things. You have that parasite. You need this thing. You have that virus. Maybe this thing, but the terrain doesn't need to be made too complicated.

Dr. Eric Gordon:
Yeah, I like that. I mean, every once in a while people have those funny snips where you don't know what's gonna set off that sympathetic nervous system, but the basics that liver transporters work this direction and the toxins are mostly charged, not all of them, but mostly charged. So yes, we can buy them. That is amazing. So when you work through, are there any particular..

I said, when you have your ultra binder, but as far as liver support, so the NRF2 what are the things that you like to think about for people especially with the mycotoxin world of. 'cause they have so much the people who are really sensitive to mycotoxins seem to have so much sensitivity to the world. It seems like something gets amplified.

Dr. Christopher Shade:
Yeah, what we built up and trying to make a simple system. We did this thing called push catch. So mobilize toxins with bile, catch with the binder. And because we were doing all this liposome and nanoparticle tech activity, we can get all these compounds circulating and peaking in the blood within 30 minutes and then throw the binder behind it. So it was very discreet. And so the core of it, we had this stuff called Liver Sauce and then the ultra binder. So that was the center.

Now Liver Sauce can be broken up into a couple of different parts and like PC and the bidders, the milk thistle, those are all in there. So you can start for really sensitive patients with bitters, PC and choose something else. But what was in Liver Sauce? We had the bitters 'cause we knew we needed that. We had some PC in there, we needed that, but we usually add more anyway. We had mass cell stabilizers, quercetin and luteolin and we had DIM in to open up liver and also shift immune more on a T Helper cell. Yeah, I'm sorry, T regulatory.

Dr. Eric Gordon:
Yeah, T-Rex..

Dr. Christopher Shade:
T-Rexite. So calming down immune on that side too. And then we had the milk thistle in there which is winding up a bunch of enzymes and anchoring the bile flow thing. So all those things, one, stabilize the immune, two, open up the bile and then the NRF2 activator in there was lipoiic acid. ALA lipoic acid.

Now it's not the only NRF2 regulator whereas in the milk thistle participate in that, DIM participates in that, moving way, epigenetic problems and upregulating it. But the lipoic acid was probably the strongest one in there. So that's one that we put in or take out from protocols according to how much we want to move toxins from the periphery versus just clear the liver.

Dr. Eric Gordon:
Right, yeah because we have found that with the ALA. Yeah, there are some folks who you move very safe.

Dr. Christopher Shade:
- Yeah, you move a lot of shit there and need the liver open and flowing before you put the lipoic in there. Now we gotta open and flowing stuff in there, so if they're not really jacked up you can go right to Liver Sauce and binder. And if they are really jacked up, start just with the PC, the bitters and maybe the milk thistle, maybe the DIM. You buy individuals of all those to start with, but then on a neurologic side, we're gonna put in some CBD or GABA or both. So we have broad full spectrum CBD.

We have liposomal GABA with L-theanine and then we have CBD synergies-AX is a blend of GABA and CBD and a little bit of five HTP and some skullcap. And that one, that's my favorite one really And you give them that and then you give them the Liver Sauce and then the come down and calm down is happening at the same time as the mobilization. You can start a little earlier if you need to, but really you just do that all at the same time. And so I'll have that CBD GABA blend, the detox mobilization blend and then the binder all happening.

Dr. Eric Gordon:
Yeah, no, that's a beautiful combination. And I always have to remember. Yeah. Like you say, I treat the people who I always have to go one at a time with because they just surprise me. I mean, like, the different ways the body can protect itself from change. I mean, that is one of the problems of when you're stuck in sympathetic tone for so long, is that self protection becomes dominant. And even though it's often self-defeating, it's just what our body knows how to do. Again, this is not the thinking part of the brain that's controlling this. This is happening at the levels that are rather primitive and even if it's just primitive, it's very powerful, but tends to be very repetitive. It doesn't learn that fast.

Dr. Christopher Shade:
No, no. And that's where we like to say we have all this compensation, but we really can quite often especially when all that primitive danger response is turned on, we can protect ourselves into death, and it can get stuck and it needs to hold it.

Dr. Eric Gordon:
Right, right, right. and so, I mean, it's just, I see it, I love the way that you have structured. You're treating the brain. You're dealing with the liver and protecting the.. We didn't really talk a whole lot about the gut. I mean, do you have particular ways that you approach the gut?

Dr. Christopher Shade:
Yeah. And sometimes, I'll leave some of this other stuff up to the practitioner. There's only so many gut probiotics we need. And so many gut repair things that we need out there, but I like to take away complexity from the gut and so simplify fast as much as possible 'cause we're trying to restore the immune system in the tight junction structure in the gut, right? AMPK activation is one of the strongest things for restoring a tight juncture activity. That's what's controlling it and that's what's coming when your carb restricted or fasting. So I like a lot of fasting detox. You don't have to fast all freaking day. And especially if you have some AMPK activators, so we have an alternative to Liver Sauce called AMPK charge. And it's so

strong as an AMPK activator that it'll actually put you into ketosis, like measurable blood levels of ketosis in about to taking it faster and there's a lot of overlap on liver activity, but that AMPK activation is mobilizing fat-soluble toxins and it's helping tighten up all the tight junctures in the liver, in the brain and I'm sorry, in the gut and the brain and in the liver. So that's a real big one taking away food, certainly getting away from food allergies, probiotics, you gotta figure that stuff all sort of out. The ultra binder is a very good gut detoxifier and gut repair thing. And so, simplicity, fasting, good food, is a long-term way to shift the gut.

Dr. Eric Gordon:
Yeah, no, I agree. I mean, when the guts really not happy. Yeah, if you can. If you're strong enough to do a few days of fasting and I was interviewing, who did I speak to? Doctor Pompei or Pompoi, forget it. But anyways, he did very, very nice job of talking about fasting, actually both very important about alternating diets because so many of us fall into a diet and we just become religious about it. And this is something that I saw back in the seventies. Is that, macrobiotics were the big thing back then and it's a great cleansing diet, but I thought it was a terrible long-term diet. And that is the thing. So many diets that people fall in love with. 'Cause they felt better when they got on them.

Dr. Christopher Shade:
Yeah. Raw vegan in the beginning, you're like, great, longterm.

Dr. Eric Gordon:
Yeah, yeah. I mean, but the problem is that we tend to.. our health habits almost become our religion and it's very difficult for people to realize that you really have to be agnostic when it comes to diet because the diet that's right for you today is not right for you maybe in three months from now or six months or--

Dr. Christopher Shade:
Plus allergic to those foods when you're all dysregulated. You start to feel allergies to the things that you think are gonna help you.

Dr. Eric Gordon:
Yeah, and so it's just that I do believe that the liver support in a way is kind of the key. As I said, these are all circles, the gut, the liver, the brain. I mean and you can cut them. I always wanna be clear with people that anytime we're talking about how to treat these things, it's like pickup sticks. It depends on your body where? What move you need to do first? And it's true that it's nice to quiet the brain. 'Cause usually if you quiet the brain, it's like, everything else gets a little easier to deal with, but there are people who can't touch that brain. You better start with a few drops of something that maybe will open the liver a little bit. That's the feel component and the art of listening to what's gonna unseat. and sometimes it's just knowing enough that if you have a very sensitive patient, or you are a very sensitive patient, don't start off with the full dose. If you're somebody that can still knock back almost anything and feel okay, you can start with the full dose of supplements, but if you're--

Dr. Christopher Shade:
Yeah, that's why titrate those up really and start with small amounts and right up.

Dr. Eric Gordon:
Yeah, yeah, yeah. Cause I've even found the same thing with any binders. 'Cause binders can often set people off. It's just cause, I mean, correct me if I'm wrong since you're the chemist, but I mean, it really seems to on some level the body does work like a very tight chemical system, you move something out and then redistribution, you kinda get more stuff totally out.

Dr. Christopher Shade:
I saw that with IMD and people like to think of binders as a very passive thing. It just goes down there and you catch it, but you'll see it and we haven't elucidated what are the feedback mechanisms that do this, but you pull there and the whole distribution does happen. You just pulled out of the liver and there's some signal that says, okay, we're clear down in the gut, start throwing the trash down there. And then redistributes from cells to blood delivered to GI and binders actually do pull it down there. They don't just sit there

waiting, and we don't know exactly how, but I've seen it again and again and again, and again and again.

Dr. Eric Gordon:
Yeah, I always thought it was like those experiments where they had like the semi-permeable membrane. When you put 10 molecules on one side and it redistributes to having whatever that chemical constant is.

Dr. Christopher Shade:
Like a semi-permeable membrane, but they're active transporters. So it shouldn't much. So the absorptive gradient shouldn't be working so much because it's actively controlled, but it does. So there is signaling from the GI level up to the transporters that say, okay, we're good to dump more down in there 'cause just like you don't wanna poison the liver and the liver has mechanisms to dump shit out. You don't wanna poison the intestines, putting too much, unbound toxin into them. So there's gotta be a signaling switch that's saying, okay, let more down or don't. And once you clean up the GI with the binders, the signal definitely goes up there and the body starts letting down.

Dr. Eric Gordon:
Okay, well, one of the things that I need to arrange, maybe some, I don't know exactly when, but maybe the next year we have to have a talk with you and Dr. Pollack. Dr. Gerald Pollack, who took fourth phase water. Because, I think he has a different view of the transporters. And I think it would be very interesting. That's all.

Dr. Christopher Shade:
I know he does and I've seen and I would love to because just like I said, no, actually the toxins aren't flowing on the bile. They're coregulated. I can switch to different explanations whatever's better. And I almost see it like, I was a water scientist for a while. I was the aquatic chemist, my environmental stuff was all aquatic chemistry. It was metals and water and ions and water. So we had to think about water and how water moves and how it does things. And so I love Pollack's stuff and I almost see what he's saying. And then there's times where I'm like that can't be in every case because, and so I'd love to have the discussion.

Dr. Eric Gordon:
Yeah, I would love to because I know enough to be fascinated by what you're both saying, but I don't know enough to really ask the right questions. I will arrange this, but for right now, I have to say goodbye to our audience. but we will continue because really thank you Dr. Shade. I mean, it's been a really illuminating and I just hope that it's so important for people who are ill to understand what's going on. And as you can see, the doctors, myself, don't always understand all these processes, this is not known. We're all looking and poking and learning together. And it's very frustrating if you're the patient, but unfortunately that's what it is, but together, I think we can keep healing lots of folks.

Dr. Christopher Shade:
Absolutely.

Dr. Eric Gordon:
Okay. A pleasure.

Dr. Christopher Shade:
Thank you very much, Eric. It has been a pleasure.