Introduction and Guest Background

Welcome, to another edition of mycotoxins and Chronic Illnesses. Today it's we're going to have a, I always say we have a lot of fun. I always managed to learn a lot.

And today's going to be, a special one for that. We have Doctor Christopher Schade, with us. Doctor Schade has a PhD in environmental, chemistry, and he is founder and CEO of Quicksilver Scientific.

Now, and more importantly than being the founder, he's a man who continues to innovate and develop new products that are pretty amazing. Okay. He has a passion for healing.

And, we've been talking in that. You'll see that today and a really intuitive understanding of chemistry and biology, and especially of how our body handles toxins.

Okay. 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, again, have been a big step forward, in getting things into our bodies rather than just passing through our GI tracks.

So, so today we're going to 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 often, neglected or passed through too quickly is the neuro hepatic, coupling.

Okay. Because we forget how important the brain and the liver and bile are. So now I'm going to shut up and let Doctor Shay tell us. First of all, Yeah. Let's switch.

I'd like to talk a little bit about your background, actually, before we even get to the neuro, hepatic coupling. Just tell us a little bit about you.

How you got into, environmental medicine and what what really lit your fire? What? You know, kind of goes, you know, you got to go back into college. And when you, do or do not have that first awakening, whether that's, ethno botanical or not, in mind very much was.

And that was a pretty reductionist guy in college. I wasn't very excited. I was doing environmental chemistry. I found a pretty boring. So, you know, it was more, I was more excited about, growing organic, marijuana in my closet and, and, you know, trying psychedelics and, and I had this, you know, 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, you know, organic biodynamic cannabis that I was like, well, I'm just going to do vegetables and I'm just going to make this my life.

And so I took this shot at Regenerative agriculture, and it was a little early, you know, I got to, you know, I learned and then I got some land. I was I was an organic certified back when it meant something.

I was, use biodynamics. And I joke that I went into for I left farming the year that Whole Foods came around. There was no money. Well, 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 farm was economically viable. They were all done there.

So I started learning, going back into the science side. So I was more of an alchemist as, you know, alchemist, wizard as a farmer, then coming back into agricultural science and then I, you know, was going to get married.

So I had to go back to graduate school and start making some money. And I went in, and the chemistry of pollution around that agriculture. And then I did my masters and I did my PhD, and then I started finding that really boring because they weren't doing anything really innovative.

And when I, interviewed for my Ph. D., I was showing me two different professors, and they had this one professor who was kind of 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 because he was such a perfectionist. And, and he asked me a couple of questions that were like, mind blows right away, because if you get in the lab and I'm like, yeah, I'm great.

He goes, I need, 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. You know, he had he had built like global carbon cycling models that that are used all over the place. And global mercury cycling models.

And look up the cycle of mercury. You're going to see this picture of a lake with a factory on one side and guy fishing on the other, and a fish in the mercury raining down.

That was all his body. Just copy. Oh, wow. Okay. Yeah, I, I see the picture. All the stuff on that, and in cycling is he did the early papers on cycling of iron in the oceans.

How phytoplankton get iron. They got to release little molecules to get it. And they'll never have any hope of getting that molecule back. And so they release a molecule, it grabs an iron and it floats over to the next phytoplankton.

And he makes it. So they all have to work together. And, you know, it's a they're called severe offers, you know, and he. Oh yes. Developing all the ideas around said air Force with, at MIT at the time.

But he couldn't get anything done. And so he was now at the University of Illinois at the Egg School. And so he put me with him and I developed, I learned a freaking ton, you know, he was like, nobody had taught in such a high level.

And he was so hoc. But I could I could handle A. D. D.. And so I developed and patented this technology for separating the different forms of mercury. And I took the patents, started the company here doing environmental.

Then I went into clinical. My first two guys that worked with do a mercury measurements were Al Huggins and Dietrich clean Heart. You know, they were my first mercury.

And you know, it's a great way to start. And, and, you know, everything went from there. I offered the test. I offered the, the the binder. I M. D. that, like, takes all the mercury in the gut.

And then I started developing the liposomes because I had to get in glutathione into the system.

Detox Pathways and Neuro-Hepatic Coupling

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 the immune system.

And I stopped thinking about, you know, Mercury is this one thing. And we started talking like you and I had been talked about, 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 neuro hepatic coupling is that that's the the biggest link that you can that gets reversed and that you can affect to straighten it back out.

It has the most effect on normalizing everything else. I love it I love it. Okay. So let's just start there. Let's just I mean, that that's kind of in my mind.

It's it's almost starting at the, at the end, but I, you know, because I said it's what excites me the most here, but let's go for it. Start there and then we'll go till we're back.

So what we need, like the neuro hepatic coupling, is, you know. I'll let you go like you want to lose you. All right, so what is neuro coupling? All right, so, Let's start with just an overview.

Quick of of detox from a cell. Okay. To the toilet. So if the now the toxins are either going to 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 kind of turn it into a free radical. You're going to clip a little piece off of it. You're going to make it reactive.

Now for metals, you don't need to do that. But for mycotoxins and pesticides and herbicides generally you need to do that. And then in phase two you're going to clip on one of your molecules glutathione and glue John acid or sulfate sometimes the medical group.

And that's going to 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, dump it out of the cell.

So you process the toxin, dump it out of the cell. It's going to go into the matrix, into the lymph them into the blood. So you've got cell born stuff becoming then bloodborne toxins.

So now it's circulating and now you got to get it out. And I'll often call microcosmic and macro cosmic detox microcosmic is the cell pushing away pushing away.

Now it's circulating that we got to drain it. We got liver and kidney to drain it. We're going to talk about liver because it's the most important. And, and so it has a phase three transporter that takes that conjugate from the blood into the liver.

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 hepatocyte.

They've either already been conjugated or they're raw. It comes from breathing or from, from food and, portal circulation. And then they need those phases in the cell.

So the cell either brings in 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 root lits draining down to the common bile duct. You've got the gallbladder and then down into the GI and people talk about extra hepatic spaces.

Like what blocks? Like, a blocked, bile duct or a blocked gallbladder. But intrahepatic stasis is where the neural hepatic connection is. Intrahepatic means the transporter moving from inside the cell into that little, bio.

Kind of like, use the bile route, and you have two things pumping bile. One is called bile export. Cool. That makes sense. The other one is called MP two, which is the phase three transporters that's dumping toxins into the bio and dumping bile.

So it does both. Now the transporter at the cell membrane is called P1. And P2 is now dumping into the bile. So those guys are going together. And the other thing that's feeding it in and keeping everything liquefied and moving and protected is the MDR, which pumps PC for still cleaning.

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 so 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 biosolids.

So biosolids that go to the GI and aren't used go all the way down to the large intestine. And then you have these transporters, and, and take these things and they pull them into the blood, they circulate over the liver and the anti and TCB is in the liver to going into the parasite.

And it's bringing violent. So you have toxins and bile accumulating in the cell and then draining into the bile flow into the into the bile tree. Everything's working well. Everything's cool.

Now what happens is that transport into the bile gets blocked. When it gets blocked, all of a sudden violent toxins are building up and there's inflammation building up.

And that's blocking phase two. So you get a lot of phase one done that are in. Are you to I just just just to clarify because so you're saying that the, you know normally the enter hope had to enter entero hepatic circulation is doing really nice because you it's expensive files and is a 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 when that's when that sometimes when that gets reabsorbed with the toxin on it, it gets stuck back in the liver.

Oh, no. Let's let's separate those is, people talk about toxins being stuck to the bio. So now I think just pretend that that doesn't happen. Okay? I'm going to paint the same picture, but I'm not going to connect those that.

Okay. The toxin is part of the bile, but I did just say that the bile transport and the toxin transport are unified okay. Okay. That's missed that point. Thank you.

All right. So. Oh and I didn't totally say that. The big step the bile salt export pump and MP2 are co-located on the catalytic ular membrane all the time.

They're right next to each other and they're Co regulated. The upregulate that's it. That's the bile chemically okay. The yeah the bile came from the parasite.

We're in the parasite. We want bile and toxins to go out the transporters for them. There's two transporters that are like twins. And they upregulate down regulate together.

They're always located together under severe cellular stress. They actually internalized into the cell together. They work together, which means toxin transport and bile transport are intimately and inseparably linked.

Okay, now they can also imagine you're not moving them out. Then they're building up in the cell, and they both have a, deleterious effect on the parasite.

One is toxic osis for having the toxins built up and free radical generation from the toxins. But the bile source, you can't just saturate yourself in bile, saltwater, bile salts, detergents.

Right. Therefore, they are for, emulsifying your fats. And so they will dissolve the whole damn cell. And so you have a pressure relief mechanism, and it's, transporter for toxins and a transporter for bile salts that go from the hepatocyte back into the blood.

So on the blood side, you want everything coming in, but if it builds up too much, you're going to destroy the liver. It has to dump everything back into the blood.

And this is the. Yeah. You keep going. Oh, this is great. I'm learning. Yeah. This is a really big. When I saw this, I'm like, this is show. Just explains everything. The excuses world.

So when the drainage in the biochem leaky leg gets blocked, the cell fills up with toxins and bile, and it dumps it back into the blood. Okay, okay. 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. Yeah, everything back into the blood. And when you start, you get lower back pain because then you saturate what's it going to do?

The kidneys try to keep up. Then you block out the kidneys because the same things that blow out the liver, blow out the kidneys because 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 will precede actual rashes coming out when the toxins are coming out and you have an immunological reaction 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. Wow. Okay. You know, I'm embarrassed.

I've been doing this for a long, long time, and I didn't really understand, you know, that it was that combination of of the bile and the toxins. I mean, that that that they just co transported.

I always thought that it was mixed, that they were connected to the toxin and that was the internal circulation. But this okay. How do I miss that. It's just co regulated.

And that's why the Symptomology is they go together and you know like optic bile. It's like well you bile and your toxins your bile has a lot of toxins.

This is what it is. It's not you know the bile cells are still bile salts, right, right, right. And so they just somebody connected those two. And that's what what happened might have been Shumaker but that's actually what happens is they're correctly.

And so now we get to the neuro hepatic connection is, you know, well, why does that transporter at the back get blocked? Now the most simple chemical explanation, inflammation blocks up all of that.

And the biggest inflammation that we have in these patients is endotoxin. Now yeah you have to do that. All these things will do that. But the the prototype for it all is endotoxin which comes in and winds up inflammation and blocks all these things.

Now why does and this brings up a bigger that inflammation blocks detoxification. But why is that now. It's because of the antioxidant oxidant pull that those two processes are anti.

Detoxification is fundamentally an antioxidant procedure. It plays in the antioxidant field with glutathione Nadp h you know all of your different antioxidants.

Those all worked that system all works together. And you know there's sort of master gene control and and turn it up and down as is Nrf2. So detox is antioxidant inflammation, on the other hand, you know, you've got some infection and your white blood cells are run into the game, with big sacks of peroxide and a hydroxyl radical, hydrochloric acid.

They're making oxidants. And so there's this necessary downregulation of antioxidant activity. And hence detoxification when inflammation has come to the fore. Yeah I like to think it was also we just using up a lot of those antioxidants very quickly when we get inflammation going.

That is 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've got both of those things going on at the same time.

And you know, for free radical activity you can catalytic cycle glutathione. But for toxins, you're, you're binding and you're losing it. Yeah. Yeah. So 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, you know, college status and pregnancy during those estrogen spikes.

So estrogen blocks it. But estrogen, how does that work on the brain? It activates, glutamate receptor activity.

Bile Flow, Toxins, and Liver Backpressure

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 creates 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. And it works beautifully to open up, that liver flow. So we see from the hormone linked 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 it's glutamate activity. Anything that gets you excess glutamate activity in the parasympathetic domain makes you excess sympathetic.

Anything that's doing Gaba activity is making you more parasympathetic. So sympathetic activity is what fight or flight parasympathetic is rest, digest, repair, regenerate, detoxify.

All of this are parasympathetic activities. So if anything is making you just dominantly sympathetic, you know, either you know, from a perceptional standpoint or from chemically working on your glutamate receptors, you know, those two go together, you know, so all the sudden you start sensing fear and everything all the time.

And if you 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? You know, mercury hits that mole 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.

And it just keeps going until you tamp down. You either got to calm the microglia, calm the glutamate receptors to slow that all down once it starts running.

So how do we activate microglia and their toxin. 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 know, you 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've got some leaky gut, they've got periodontitis.

The immune system is already going through that shift. And it's like not killing things. It's just reacting to everything. And then every barriers, open inflammations are everywhere.

And this thing's all jacked up and this thing's all blocked. And you kind of at that point. Well, it is it is this cycle, the downward cycle. The good part is that this is a system.

And, you know, the difference between, you know, linear machines and people is that we have our countervailing forces are I mean, because everything in the body or you say is this is in cycles.

And so it's designed for, for counter for countervailing winds to always be appearing. You know, you don't you don't go all one way until you're really pushed to the edge.

So I mean, that's that's what saves us. So, you know, is able to do things and in train, you know, 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 cells and other things will and train back around it. And you know, 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 there's 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 portion that's in there where you can work out more specifically?

Yeah. And just to always remind people how the, the wisdom of the body is, that even just things like with estrogen is that. But when estrogen is metabolized, well, if there's enough I don't think so.

Working you you also make all and all interestingly enough it's the end product to the estrogen metabolism is you know, quiets down the microglia quiets down, brain inflammation.

You know, it's it's yeah. So there's I mean, we actually use it in EMS and in head trauma. Again, because it's that some of the, the, the world of neuro steroids is an incredibly complex in my mind.

And you just don't, you know, you know, just because you see, with progesterone, you can find your most people. It's very relaxing. You know, it goes to, one of the pregnant derivatives that just, relaxes the brain.

But then there's a small percentage of women who. It makes them cry. You know, it's just there's a I don't know what the percentages, but it's a small percentage.

I'd never really figured out the whole story, but, you know, so it's just the dynamics of the body are just amazing because we there's compensations that are set in there to always bring us back to home, to, to something close to a homeostasis.

So homeostasis is a bad idea because if homeostasis has got to death, if there's no movement, we need to move

it, you know. But obvious basis. Yeah. Right. Yeah.

We need to keep moving and, and and that's what. So let me just go back because you just you just gave us a firehose, you know, which was well, and I love you, I love you, but let me just, I think what's the phrase?

Now unpack that a little bit. Yeah. Okay. So, you know, because you, you pointed out some really important pieces that when the gut is inflamed and you and once, once the gut's inflamed, for whatever reason, if there's backed up and there's almost always bacterial overgrowth, whether it's upper or lower or bacterial imbalance, especially if it's lower, you know, you start having inflammatory chemicals, the most obvious ones, you like the lipopolysaccharide.

So 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.

Right to the liver and right to the liver and to the. And they're going to get to the brain. Yeah. But when they get to the liver and they start causing inflammation there you, you, you part like when that liver cell, if that liver cell is also dealing with other toxins at the same time okay.

Can the toxin load. So I that's what I'll 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 that's because you know the form 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 of my picture was that the, the, toxins were bound to the bile acids.

But really what you're saying is that they're just co they're just they're flowing together in the same stream. Yes, yes. So when you're talking a little bit about that.

Yeah. And so space 1231 you activate, you activate the toxin or in this case the hormone. You're making a more reactive hormone. And then in phase two, you're going to, put a compound on to it.

Glute assignment, glute chronic acid or sulfate with, with, estrogen. Say it's glute. You're out of gas now. That's great. Thank you. And, anion, it doesn't need to bind on to, and yet, you know, albumin or some carrier molecule, it's free now on its own.

And so then it needs to be dumped out of the system by the liver, and the liver is going to dump it through this transporter to MRP two moves, toxins and bile and mist.

P2 twin sister is bicep bile salt export pump and bicep. And that might be two. They are twinned together. They are separate transporters but they upregulate and they down regulate together.

They are always located right next to each other in the candlelit killer membrane, the membrane dumping of the liver into the bile tree. So when you block they are blocked together, upregulated together.

And so when you blocked 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 and they are flowing together.

The toxins in the bile are flowing together. And so the bile comes and the toxins come. And people just thought that the bio was binding the toxins, right?

Because so many because a lot of the things that we use to detoxify are often will also bind bile. Yes. And that's what. So that's where okay. That's where I got confused I think is that sneaky.

But really it's just because they're both negatively charged. And yeah the bile salt two negatively charged and the toxins are negatively charged and they stick to the anion exchange resins.

Because you decouple that when you use IMD or silica with the sulfur hydrate groups, because that is not an ion exchange binding. That's, that's a covalent binding between the sulfide groups and the metal.

And so there you you grab metals out of circulation, but not bile. Yeah. And that I do. So I recommended that the IMD is something I have. It was, is, is a great a great place to start and to continue with, with patients with, with mercury issues because you can use it as such tiny doses that you can find the level that won't make people sicker, because that's always a big issue removing mercury.

And, what's great is, you know, tiny, tiny dose. You can usually get away with it. Yeah. Okay. Yeah. So but so but that was that. But thank you I mean again I mean little embarrassed I don't know if it was my mind this apprehension.

You know it's funny how you do this. You know, 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. Yeah, a lot of people were saying that, oh, the toxic bile and stuff. And I'm like, wait, no, actually, you know, same thing. You know, they go together, but not for this, the reason you thought.

And it's good to know specifically why. Yeah. Oh, no, it is very helpful. Very, very helpful. Yeah. For for thinking about this okay. So we got that. So, so basically you got with I got that hope that everybody listening is that, you know, so your bile and your toxins are moving.

They're swimming together. Yes. Okay. And they're and and the, 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. Yeah, yeah, yeah. So now that's what. That's what gets you into trouble. Okay. And then what what happens? As far as the toxins, I mean, again, when we have the leaky brain and just, toxins getting into the brain.

But I guess your point is that once, once you get inflammation going, you're going to start affecting your brain and sort of having inflammation, and that's going to feed back and also a brain barrier.

And then the toxins are going to get there. So you've shut down the liver. You're dumping toxins out of the liver into the blood instead of dumping them 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 it. Calm the brain. Release the liver. Right, right, right. Yeah. And the end. Because as we as long as the data seems to be accumulating, leaky gut is going to increase your likelihood of leaky, leaky brain, and any endotoxin source.

So, you know, yeah, UTIs have been known for a long time, but one of the ones that people missed was periodontitis. There's great papers on periodontitis and endotoxin, Mia periodontitis and cardiovascular disease, polio and depression.

All those are inflammatory disorders from endotoxin. Yeah. So the teeth are a big way to attack this. Whenever you have this whole system going on, your immune system's going to be all fucked up too.

And so you probably are controlling the microbiome in your mouth and probably a periodontitis. So water picking, you know, brushing your teeth with artemisinin or biocide and, or, you know, just really taking care of the, the oral periodontal space.

Oh yeah. We have antimicrobials and anti-inflammatories while you're treating all this other stuff. Yes. Yeah. Because, you know, 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, because, I mean, a lot of peri dense 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're going to we're talking to a few. We talked to a few folks about that.

The oral chronic dental infection is a great source of low level persistent inflammation, which is going to light up everything. But so yeah, you know, like a lot of people brushing with vitamin C, they'll do liposomal C and brush.

Would that have a big a big result because they're, you're fixing you're, you're feeding the connective tissue. Yeah. Yeah yeah yeah. Vitamin C and proline.

Very important for a connective tissue. So you know, and so like, how do you know, how are you, how do you think we should be looking at, helping people detox mycotoxins?

Is there a particular. Yeah, that's why we set up all this neuro hepatic thing. Because the mycotoxins are really good at that. They're really good at knocking out bile flow, shutting down liver.

They post-translational depressant or up to that means, you can either block the production of inter of two by blocking the gene transcription. But after you've even transcribed it, they're blocking, its activity.

So they're, they're shutting down detox very effectively. And they very effectively wind up neuroinflammation. So they create this whole system and that it makes it very hard to detoxify.

Inflammation, Stress, and Neuroinflammation

So just talking about these two sides of it, we need bile flow. We need binders and we need neurological come down. And so on the liver side we use bitters.

We, we put bitters into a liposome. We have bitters number nine, which is a little better for your stomach, and bitter ex, which is better for stock bile flow.

So we use that and PC remember the PC is always being faster and calling is always being donated from the hepatocyte membranes into the bio flow. And in fact, if you're choline deficient and this whole PMO red herring thing like that 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 excess. Because as soon as you're short and choline in the liver, you go static immediately. And what do we do then?

Then you lock out all the platform. Yeah. Yeah. No, just say choline is so important to people. I mean, all this, you know, we have so much of the nonalcoholic liver disease now and it choline deficiency, you know, after you've gotten rid of your sugars.

Yeah. Yeah. Is a big thing for people to remember. Yeah. So and I do I do agree I think that HTML ale stuff is overdone. Yeah. Yeah. And so PC is always being donated and keeping it flowing.

So we, we give PC and bitters. And that's the basis of making all that stuff flow. All this stuff on top of that milk thistle also ensures so but one of the things when that, that inflammation and 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 with them a little bit and get the load down.

That's one of the ways that milk vessels protect. It's ensuring that bile flow continues. All right, so I that's that's fascinating. I love when people have done deep dives on the, you know, the functioning of, of the natural, of the herbals.

You know, it is so interesting to see, like how they they dance in so many ways. Yeah. I guess you got a list of things. Oh, works on liver. Well, what part of work?

What are we accomplish here? All right, so those for keeping the bio flow going, but, and then binders to keep every binder, everything that goes down there.

And, you know, we use we have this stuff called Ultra Binder that's a blend of charcoal, chitosan, which is like a, well, call but natural well, call and, and zeolite, along with I have Dr.

Metal binder and some cases of gum and aloe. So that's a cocktail there because each one I like it, grabs a swath of the chemical soup of toxins out there.

Or if you did go prescription, you got Kostya me in it. Well, call, 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, it's going to be you're going to be working upstream the whole time. Yeah. My favorite.

Let's talk. What I mean because I think a lot of people miss I always say I mean the brain controls. Yeah, the brain does is the final controller. I'm not talking about the thinking part of brain.

No, that's that's that's coming along for the ride and all misdirecting us. But yeah, but the the basic but the brain, I mean, the parts of the autonomic system, I mean that really orchestrates our immune response.

So how how are you looking to help, orchestrate. Yeah. Well it's prioritizing, right. And if you're sympathetic, dominant all the time, it will prioritize your biochemistry away from these luxuries of clean up and regeneration.

That's why stress ages you and kills you. Very simple, very, very simple. You know, or fight or flight or rest, digest, repair. Regenerate, detoxify. So in the neurology we got to 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 you know, I it's almost ten years ago now, maybe nine, and started applying it to autism.

Now in autism, you probably worked with some of those. You want to start detoxing an autistic kid. First you say the word of the supplement. You want to use that for about six months.

Then you show model for six months. Then you make a homeopathic for three years. Then you put a molecule into the homeopathic. You know, it takes about 20 years, you know, and the kids, you know, grown out of it or, you know, whatever by then.

And that's because the neurology was just, you know, them. They're, they're, they're they're glutamate receptors all jacked, and they're all over on that side.

You put something in and they go farther over there, shuts everything down. They have a terrible reaction that comes through their skin. You know, they have diarrhea. Everything's crazy.

But if you give them CBD first, all of a sudden you can give them like adult doses of your best thing. It was like, oh my God, you know? And I first tried this with Gaba, with blind people because they have the same thing.

Here. Try this. Yeah, I heard and it's just the the neuro immune system goes not to the immune or the brain, you

know, they're they're so linked they go crazy.

And I saw oh you give them Gaba first. Oh now I can give them detox stuff with that. Flip it 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 got Gaba, glutamate balance. CBD is more pushing down glutamate excess and stopping, the microglia activation.

So it stops that neuroinflammation. And that's allowing Gaba to shine more. So you can use the both really there's cannabinoid receptors on the immune cells and govern receptors on the immune cells.

So I tend to use a blend of Gaba and CBD and that oh they calm down. The glutamate receptor 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, you know, the brain and the liver is really the start of bringing them back down to normalcy. Yeah. No, that that is yeah.

That's the dance. I mean, it really is. I mean, this is what, you know, the whole I'm a big you know, I in people know I, the proponent of Doctor Navios the cell danger response thing and basically that's what he saw is that when he blocked what the, you know, the pure energy receptors for autistic kids, which is very similar, is because they're the dangerous signal.

They're the the essential dangerous signal. And, you know, and the glutamate is, is kind of the next, the next. Yeah. That's the extracellular, you know, danger or the intracellular danger signal writ large.

Yeah. And if we can and that same, that same thing for, autistic kids, you know, have the best response because the system is still fresh, you know, 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. Yeah. Not so much neurological dysregulation on a cognitive right.

Exactly. It's the autonomic system still thinks computery but right, right. But the cognitive system is developed. So you just get brain fog and fatigue.

But you're not usually, you know, 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, and with adults.

But but so but you really find that the CVD has been a very, very big component of what you've done over the last. Yeah, it's a game changer for autism mold, Lyme.

You know, there's one where neuroinflammation is a huge part of locking them into step. Oh 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 I see. Okay. Nanoparticle dim. And first thing that I noticed was it was removing food allergies. So GI food response to children. But why is that?

We thought it it just affects estrogen stuff. Well, no, it's just we might just remind people that it's di indole methane. And yeah, it's something we've always used to help people deal with excess estrogen or metabolism of estrogen.

Yeah. And giving you better non-cancerous, metabolite estrogen. Well, guess what. It is a big, immuno tolerance thing. So it switches, from a teenage to teenage 17 dominance to regulatory dominance.

And I was taking it apart. 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 and in different models of IBS, and where it was, you know, this immune dysregulation, and in, in Nash and in liver inflammation, it flips it from that as part of the generation of alcoholic and then, fibrotic liver is this runaway immune flip into this pro-inflammatory wing.

Teach 2817. And it's not we used to, you know, teach one versus two, but this pulls it to regulatory dominance, which is one of the things you're trying to do with probiotics is to what probiotics do when you grow up with your food.

Is it teach you tolerance to 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 and or off to making inter of two more available when it's been shut down.

Mycotoxin Detox Strategies and Supportive Tools

So when most people were Nrf2 seems blocked in the liver. Dim has been a magic show for opening that back up. It that is fascinating. I, I just I love and you know, each year we use so many things and we approach them, you know, in our thinking as though they're, well, even I'm going to say as drugs, but even drugs have that same, that same, capacity to surprise us with how many other pathways.

Yes. You know, thing, you know, are interrelated. I mean, we just always make that mistake of thinking that this system only has has one directional lanes and.

Yeah, not for estrogen or like drugs. Ivermectin is is for a worm. Oh, look, it works on a virus too. Cool. Yeah I know, I know that that's been the biggest joke because we've used ivermectin for probably, I don't know, 18, 20 years.

And but we thought we were treating parasites. But people would say, you know, I'm, you know, all these symptoms would get better sometimes. And I go like, it doesn't sound like you. Yes.

It's like it comes at a very, very, you know, it's like, I don't get her. I have to go. And, this is another one of these things of, like, you know 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. Yeah. Because if I had gone back to really look at the basic literature.

Ivermectin. But the thing is, in before Covid, you couldn't the, the, the, its effect on the immune and immunology was there but it was buried deep, you know, and you only first saw the, you know, its effects on, on chloride channels, you know, and yeah, it was all people talking.

But anyway, we don't I don't want to think about stuff, but that is it's just it's so wonderful when we have folks like you who have the scientific background and the chance, the opportunity to keep going deep for us and bringing back how these things really work.

Yeah. You know, how we use them in different scenarios. Yeah. And and I like, you know, really, you know, what we're trying to do here is create a more universalist.

Everybody's in the individualization right now. But you know, we are humans. There's not so many different ways that things work. But I want a pretty universalist core to our protocols when we approach this, you know, brain liver binder here, the things you can use here, the things we like to use, let's get that all going.

And then we can pick out the individual things. Oh, you have that parasite. You need this thing. You have that virus, maybe this thing. But, you know, the terrain doesn't need to be doesn't need to be made too complicated.

But.

Yeah. Well, I guess, you know, I like that. I like that, you know? I mean, every once in a while, people have those, those funny snips where, you know, you don't know what's going to set off that sympathetic nervous system, but, Yeah.

No, but actually, no, but the the basics that, you know, the lipid transporters work this direction. Yeah. You know, and the toxins are, are mostly charged.

Not all of them, but most charge. So yes, we can we can bind them. You know that that is, is amazing. So when you, when you work through on it, are there any particular, you know, you know, I said when you have your ultra binder, but as far as liver support, so the Nrf2, what what are the things that you like to think about for people with Michael, especially with the Michael toxin world of, you know, because they, they have so much, the people who are really sensitive to mycotoxins seem to have so much, then, sensitivity to, to the world, it seems like something gets amplified.

Yeah. So what we built up, we built up, you know, 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 activity, we could 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, you know, we had this stuff called liver sauce and then the ultra binders. So that was the center. Now liver sausages can be breaking up, broken up into a couple different parts and, like PC and the bitters, the milk there.

So those are all in there. So you can have a, you can start for really sensitive patients with bitters and choose something else. But what was in liver sauce?

We had the bitters because we knew we needed that. We had some PC in there. We needed it, needed that, but we usually add more anyway. We had mast cell stabilizers, quercetin and luteal, and we had the we had them in to open up liver and also shift immune more on a T helper.

So, you know. Yeah. I'm sorry. Not t regulatory sorry. Yeah. T-Rex teeth website 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 immune to, open up the bile. And then the inner of two activator in there was like pork acid or lipoic acid. Now it's not the only enough to a regulator where sting and milk thistle participate in that.

Didn't participate in that moving way, epigenetic problems and up regulating it. But the my podcast, it 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.

Right? Yeah. Because we have found, you know, there was alpha. Yeah. There are some folks who. You moved a lot there. Yeah. You move a lot of ship there and need the liver open and flowing before.

Before you put the pollock in there. Now we got open and flowing stuff in there. So if they're not really jacked up, you can go right to liver source 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 know, you can you can you buy individuals of all those to start with.

But then on the neurologic side, we're going to 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. Synergy acts is a blend of Gaba and CBD. And you know, a little bit of five HTP and some skullcap. And that one, that's that's my favorite one, really.

And you give them that, and then you give them the liver source, 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 you know that CBD, Gaba blend, the detox mobilization blend and then the binder all happening.

Yeah. No, that that that sounds, you know, that's a beautiful combination. And the the the I always have to remember, Yeah. Like you say, you but I, we where I treat the people who, you know, I always have to go one at a time with because they.

You surprised me. I mean, like, you know, the 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. You know, again, this is not 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 and you know, you know, it's just, primitive is very powerful but tends to be very repetitive.

It doesn't learn that fast. No, no. And that's where, you know, we like 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, you know, and get stuck.

And it needs to hold it. Okay. Right. Right, right. And so, I mean, it's just I see you're you're, I love the way that you have structured, you know, you're treating the brain.

You're dealing with the liver and protecting that. And we didn't really talk a whole lot about the gut. You know, I mean, what what, what what is it? Do you have particular ways that you approach the gut?

Yeah. So, and sometimes, you know, I'll leave some of this stuff, some of this other stuff up to the practitioner. You know, there's only so many, probiotics we need and so many things that, you know, gut repair, things that we need out there.

But, I like to take away complexity from the gut, and, you know, so simplify fast as much as possible, because we're trying to restore the immune system in the type junction structure in the gut.

Right. You know, Ampk activation is one of the strongest things for restoring, type Judger activity. That's what's controlling it. And that's what's coming when you're carb restricted or fasting.

So I like a lot of fasted detox. You don't have to fast all day, especially if you have some big activators. So we have an alternative to liver sauce called amp 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 well, you're taking it fasted and a lot.

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, in the brain and in the liver. So that's a real big one. Taking away food, certainly getting away from food allergies, probiotics.

You know, you got to figure that stuff all all sort of out. The old binder is a very good gut detoxifying and gut repair thing. And so, you know, simplicity, fasting, good food, you know, is a long term way to to shift the gut.

Yeah, yeah, yeah. No, no, I, I, I agree, I mean the, the when, when the gut's really not happy. Yeah. If you can, if you're strong enough to do a few days of fasting.

And I was interviewing her. I spoke to a doctor. Pompei, upon poly forgetting. But anyways, he did a very, very nice job of talking about fasting and actually both very important about alternating diets because so many of us fall into a diet and we just become religious about it.

And, and I've this is something I saw back in the 70s is that, you know, macrobiotic sweets, the big thing back then. And, you know, it's a great cleansing diet.

But I thought it was a terrible long term diet, you know, and, and that's and that is the thing so many diets that people fall in love with their because they felt better when they got on them.

Yeah. You know, but you know, raw right in the beginning like oh great. Long term. Yeah. Yeah I mean I mean but the problem is, is that we tend to, our health habits almost become, our religion.

And, and it's very difficult for people to realize that, that you, 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 plus. I'm allergic to those foods. When you're all dysregulated, you start to feel allergies to the things that you think are going to help you.

Yeah. And then we're. And so it it's just. But I do believe that the liver support in a way is is kind of the key. I see. You know, as I said, I, you know, these are all circles, you know, the gut, the liver, the brain.

I mean, you know, and you can cut them. And I always want to be clear with people that anytime we're talking about how to treat these things, it's, it's like pick up sticks.

You know, it depends on your body where what move you need to do first. I mean, you know, and it's true that, yeah, it's nice to quiet the brain because 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 know, you better. You better start with a few drops of something that maybe will open the liver a little bit.

You know, it's that's that's the feel component. And the art of listening to to to what's going to unseat. And you know, and sometimes it's just knowing enough that if you have a very sensitive patient, you know, or you are a very sensitive patient, don't start off with the full dose, you know.

Yeah, it's if you're somebody that can still knock back, you know, almost anything. And feel okay. You can start with the full dose of supplements. But if you're.

Yeah, that's why I would like to like can titrate those up really and start with small amounts and write up. Yeah yeah yeah. Because I'd even found the same thing with any binders, you know, and is because binders can often set people off.

It's just because, you know, I mean, you're a 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 kind of get more stuff towards it out. I saw that with our M. D., you know, and people like to think of binders as a very passive thing.

Oh, it just goes down there and you catch it, but you'll see it, you know, it's and we haven't elucidated what are the feedback mechanisms to do this.

But you pull there and the whole distribution does happen. Oh you just pulled out of the liver and there's some signal. It 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, they actually do pull it down there. They don't just sit there waiting. And we don't know exactly how, but I've seen that again and again and again and again and again.

Yeah. I always thought it was like, you know, those experiments where they had like semi-permeable memory, you know, when you put, you know, ten molecules on one side and it redistributes to have you, you know, whatever, whatever that chemical constant is like a semi-permeable membrane.

But it's not. But they're active transporters. So it shouldn't so much so that us what a gradient shouldn't be working so much because it's actively controlled.

But it does. So signaling, you know, from the GI level up to the transporters that say, okay, we're good to dump more down in there because just like you don't want to poison the liver, and the liver has mechanisms to dump shit out, you don't want to poison the intestines putting too much, you know, unbound toxin into them.

So there's got to be a signaling switch that's saying, you know, okay, let more down or down. And once you clean up the GI with the binders, the signal definitely goes up there and the body starts letting down.

Okay. Well, you know, one of the things that I need to arrange, maybe I don't know exactly when, but maybe the next year we have to have a talk with you and, Doctor Pollack, and Doctor Gerald Pollack.

That helped with your fourth phase. Water. Yeah. Because because I think because, you know, he has a different view of, of the transporters, you know, and I think if you put I think would be very interesting, that's all I think I know he does and I've seen them.

I would love that because I can just like I said, no, actually the toxins aren't flowing on the bile. They're regulated. I you know, I can switch to different explanations, whatever.

But I like that one. And I almost see it like I was a water scientist for a what? Well, I was an 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, I love Pollock stuff and, and I, 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 that discussion. Yeah. No, I would I would love, love to because you know, I know enough to be fascinated by what you're both saying.

Yeah. I just need, you know, but I don't know enough to really ask the right questions. Yeah, yeah, I think so. Anyway, that we could we can we I will arrange this, but for right now, I have to say goodbye to our audience.

Yes, but we will continue because, you know, I really thank you that you shared. I mean, it's been, really illuminating. And I just hope that that it just, you know, it's so important for for people who are ill to understand what's going on.

And as you can see, you know, the doctors myself don't always understand all these processes. This is not known. You know, 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. Absolutely. Okay.

A pleasure, thank you very much, Eric. It has been a pleasure. For.