Endotoxin's Role In Chronic Inflammation Transcript

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Introduction to the Guest and Topic

Welcome back to the conquering Chronic Inflammation Summit. I'm your host, Doctor David Jokers. And today my guest is Christian Jordan off. And he is.

You can find him at Live Longer formula.com. And he's a wealth of knowledge. He's a longevity author, functional health practitioner who specializes in helping clients, overcoming existing health challenges optimize their well-being and increase their longevity.

His latest book, which is a really good one, is called How to Actually Live Longer, and it's the first in a series dedicated to slowing the aging process and increasing longevity.

Christian's work focuses on addressing the root causes of declining health and helping clients not only resolve their current health issues, but also extend their vitality and improve their quality of life for the long term.

He's also the author of the Autism Wellbeing Plan How to Get Your Child Healthy, which is a comprehensive resource that helps parents understanding address the health problems affecting autistic children.

Again, today we're talking all about endotoxins role in chronic inflammation. So you guys are in for a treat with this. Without further ado, let's go into the interview with Christian.

Well Christian, great to connect here. And this is a topic I really like talking about. It's really important topic. We're going to talk about endotoxin in particular, something called lipo polysaccharides LPs and its role in chronic inflammation.

Really important topic. And I'm glad I've got an expert here with Christian. And we're going to break this down in detail. So welcome here. And Christian.

And let's, let's go into what endotoxin is and where it comes from. Yeah. So basically endotoxin is the more commonly used name now for LPs or lipopolysaccharide.

And this is a fragment in the outer cell wall of the so-called gram negative bacteria.

What Endotoxin Is and How It Triggers Inflammation

And I don't know the exact numbers, but I've seen some papers stated there's like 2 or 3 million, or even more of these fragments inside a single bacterial cell.

So the, the real implication is to, to, to human health is what happens when that bacteria completes its life cycle. It dies and its cell wall starts to rupture and disintegrate and that endotoxin particle or those millions of endotoxin particles gets spilled into the gut.

That's really where things get interesting for our health. Yeah, absolutely. So how does endotoxin you talked about how it kind of spills into the blood.

How does it actually trigger inflammation. So very simply put we have certain receptors on certain cells. So our white blood cells, some of those white blood cells like the macrophages the monocytes, they have the toll like receptor for Tlr4 receptor.

And very simply when the receptor has the LPs particle or the endotoxin particle attached to it, that basically triggers that cell to release, to release immune, basically inflammatory mediators like cytokines.

So TNF alpha, interleukin one beta, interleukin six. And that's what initiates the cascade of inflammation in the body. Yeah. And these gram negative bacteria, a lot of them people have heard of because they, you know, cause major issues like cholera.

You've got salmonella in their H pylori, E coli. Right. And so, you know, when I think about it, I think about it as, you know, more people throughout the history of mankind have really died from some sort of a chronic and or systemic acute infection, I should say, sepsis, basically.

And, you know, our ancestors may have been hunting and they may have fallen and got a tissue wound, or they may have been attacked by an animal or attacked by a person.

And it wasn't the actual attack that would kill them, but it was the flesh wound. And then the bacteria getting in, triggering, you know, basically a bacteria getting in, getting, spreading throughout their body, getting into their lungs, causing pneumonia, getting into their nervous system, causing meningitis or encephalitis.

And that's what it would end up killing them. So the immune system's responding to something that it sees as a threat to immediate survival and creating this inflammatory process because inflammation supposed to get the infection under control so we can live right.

And that's kind of really the idea here. And, you know, in our, our society today, we're really dying from, you know, a cut, right, a wound or something like that.

But instead we deal with leaky gut. Right. And so we've got intestinal permeability. And now these same molecules that are immune system has trained itself to create this sort of inflammatory process to they're seeping into our bloodstream from the gut.

And the body doesn't necessarily know if it's under threat. But it sees this molecule and it thinks, okay, we got to create a a strong immune response.

Would you agree with that? Exactly. That really. Well potent that that's the thing that floored me when I found out, you know yourself, you probably run the gym up on plenty of, patients, but when I, sort of it hit me that the, the Bacteroides, which are one of the larger sort of genera of, of bacteria, that can, you know, a human, at least a Western human gut can have some 30% of its bacterial species or population.

Of these Bacteroides, and they're gram negative. And a lot of those are considered commensal, you know, either benign or beneficial. And that's when I realized, wow.

So we have a lot of gram negative bacteria to begin with. And then on top of that, we have a lot more, there's a lot of other species that are kind of some are frank, like you already mentioned a few some are frank pathogens, some are more opportunistic, inflammatory, this biotic type bacteria, you know, like, for example, even H. Pylori, although it doesn't reside in the in the large intestine.

Gut Permeability, Mitochondria, and the Vicious Cycle

That's on the gram negative one you mentioned, the I forget the name of the one that can cause meningitis. It's a it's a fairly fancy name. You know, the the the ones that can cause, pneumonia.

Pseudomonas morgenfeld. Klebsiella. Yeah. So we're really, in the modern world because of all the chemicals in the food supply, because of all the sort of unprecedented levels of stress, our guts are generally not in great shape.

And that leaves us vulnerable then to these endotoxin particles getting into the human, into the circulatory system and the the done research with where one was it microgram, you know, one microgram of endotoxin per kilogram.

So let's say a regular person, maybe 100g, 100 micrograms of endotoxin would be enough to cause shock, septic shock. But so we're talking about a tiny amount of this stuff.

And so I've seen that somewhere in the paper, they estimate that the human gut contains about a gram or so of endotoxin. So not a lot. But we're talking about micrograms of this stuff getting into the bloodstream, causing anything up to, of course, septic shock and all this stuff is really very far on the spectrum.

But between there and, you know, no endotoxin. We have fever. We have, you know, a lot of inflammation, sickness, lethargy, fatigue, all the sickness type symptoms.

Yeah. So it's an extremely strong potent trigger for inflammation. In fact in rat studies when the scientists want to put the rat in an inflamed state, that's what they use.

They use endotoxin. I'll just inject it in to create this kind of pro inflammatory state within the rat. And then, you know, go along with whatever experiment they're doing.

So it's a big issue. And like you were saying, those gram negative bacteria, a lot of them are commensal. They're their normal, normal inhabitants. So it's not like these gram negative bacteria are all bad.

There are some that, you know, we want to obviously minimize, but in general we're going to have a certain a certain amount of gram negative bacteria that have this outer wall with lipopolysaccharide and it should be kept, you know, basically all of that should be in balance, right?

In our in our ecosystem. But when we start to create problems in our gut and, and develop intestinal permeability, now a lot of these things can seep out into the bloodstream and cause problems.

Yeah, exactly. And you know, the the other thing I, I personally think is, overeating fiber, if you have a predisposition of overgrowth of some of the like even even though like just recently I had a client, his commensal bacteria, the Bacteroides, were way into the top of the range and beyond on the GI map, but he was also purposely taking fiber supplements to lower his cholesterol, which, you know, that's a whole different sort of story.

But he had a lot of loose stools. So it really kind of goes to show you that even, you know, if if you overfeed fiber and you have some kind of inflammatory imbalance or even if you're just overfeeding that regular bacterial population, that that can cause that, that can start causing problems for a person, for sure.

Yeah. For sure. And these endotoxins also will poison the mitochondria so they damage mitochondrial function in the mitochondria, in the intestines. One of their jobs is to produce energy from from oxygen.

Right. I mean, through all of our cells, that's healthy. Mitochondria will produce a lot of cellular energy through respiration. And so through the use of oxygen.

However, when the mitochondria become damaged, they become obligate sugar burners. Basically like glycolysis. And they can't use oxygen. And so that would leave extra oxygen.

They would basically producing all their energy through anaerobic glycolysis and oxygen would be left in the gut lining or in the gut. And now you get an overgrowth because there's too much oxygen in the gut of aerobic bacteria.

A lot of the the pathogenic gram negative bacteria like salmonella, like, the one that causes cholera are, are aerobic or facultative anaerobes where they can really survive in that aerobic environment.

And then the really good bacteria that we want that produce post biotic compounds that strengthen the gut lining, like for example, Aquaman. Jamison Ofili.

And fecal bacterium, CI and things like that. They need a very low oxygen environment. So when the mitochondria become damaged by different environmental toxins, glyphosate, all kinds of different things as well as endotoxin, now we end up with more oxygen in that gut environment.

And an overgrowth of these, these aerobic bacteria, many of them gram negative, releasing LPs, causing more

further, like a vicious cycle of inflammation.

Our system. Exactly. A vicious cycle is exactly the word because we know that a huge portion of the immune system is in the gut, co-located in and around the gut.

So if you have endotoxin spilling into the lumen, you're going to have immune cells there already triggering inflammatory cascades. Now to your point, some of those inflammatory cascades can include nitric oxide A, prostaglandins leukotrienes being released.

And we know that nitric oxide can complex with complex for I think of the of the mitochondria. And that can of course cause energy production pathway issues.

Fiber, FODMAPs, and Personalized Gut Diets

But then the inflammation that and the other inflammation being caused by the, you know, the immune cells, the white blood cells in the gut can then cause collateral damage.

I sometimes explain to my clients, it's like inflammation. Like you said, it's an acute sort of healing mechanism. But when it's chronic, I sometimes liken it to a yo, if you have a fire and the sprinklers turn on in your in your house or whatever, they're going to damage your books or carpet your couch.

So this inflammation causes a lot of collateral damage. And some of that collateral damage will be to the T junction proteins, you know, joining our gut cells.

And that's where now when these, sort of open up, we have more intestinal permeability. When these start to seep into the bloodstream, really, anything can happen at that point.

We can have endothelial lining damage. You know, that's honestly, I believe that's a much, much bigger, causal factor in atherosclerosis. And, you know, although all those heart disease related things related to damage to the arteries, but then it can also, I've also seen that, endotoxin can cross the blood brain barrier.

And once in there, then it can trigger microglia, the resident immune cells in the brain. And then, of course, that opens up a whole other can of worms from anything from anxiety, depression all the way to neurodegenerative conditions like Alzheimer's and even Parkinson's.

So really, we have to we have to take our gut health seriously, which we probably preaching to the choir here, of course. Yeah, we definitely are. But at the same time, the the conversation around endotoxin, we talk a lot about gut microbiome, but not a lot of people are talking about the role of endotoxin and how it impacts these systems.

And basically any chronic inflammatory condition. We have to take into account the endotoxin load on the body. And we'll talk a lot about environmental toxins, mold, mycotoxins, glyphosate, microplastics. Right.

And those are all big factors because they can definitely poison the mitochondria, cause all kinds of different issues. But we also have to take into account this role of endotoxin in the body, because literally any chronic inflammatory condition and a high endotoxin load could be one of the root cause factors.

We've got our address, and you mentioned earlier how, you know, your client was eating high fiber, right. And so high fiber in the natural health world has been talked about for a long time. As always, good, right?

Yeah. And, you know, we as we know, in natural health, nothing really is always good, right? Nothing that isn't. And there are some things that are always bad.

Right. But, you know, with fiber it could be good in certain circumstances, but it also can be very bad. And a lot of times, in many cases, it's actually fueling more inflammation in the body.

Exactly, exactly. And I think absolutely, this has to be some kind of sweet spot for people, because from what I've seen, some of these, gram negative bacteria, from what if you look up what, what kind of stuff they can eat, okay, we know that they can eat simple sugars, but really, there should be no simple sugars making it all the way down to the large intestine.

So I don't think that's such a big risk. Then they can, you know, ferment, purify various like undigested proteins, various amino acids. But again, that's that's stuff that we should ideally be digesting and absorbing in the, you know, somewhere along the way in the, in the small intestine.

So that should in a, in a healthier digestive tract, that shouldn't really be a problem. The problem really is, the, the yeah, if you give them a lot of fiber, you're feeding them if but if you take away all fiber.

I've also seen that the some of them at least they can actually, munch on the mucin. So the mucus layer that we produce on kind of lining the intestine, some of those guys can get into there.

So I really think not not to say everything is moderation. I think that's such a copout to to like it's a little bit intellectually lazy. Almost everything in moderation would be fine.

I think there's definitely some value to fiber because some also some of this fiber can be, act like a binder so it can bind certain things like bile acids and things like that, that if they make it to the large intestine, either bacteria can transform them into something potentially more irritating, or they themselves can be irritating.

That can cause, like, things like loose stools and stuff like that. So I think, absolutely, a little bit of fiber surely doesn't hurt, right? Because, you know, fruit has fiber.

And I don't think I don't think we're going to say that fruit is bad universally. So yeah, absolutely. I think, though the whole fiber thing is we figured out we have bacteria in the gut, you know, sometime ago.

Then we figured out they produce certain things that are beneficial. So then we were like, okay, well, we gotta feed them like a pet. As if there are, like, a dog or a cat.

We gotta. Or a pet worm. We gotta feed all the time to, to make sure they grow. But I think there's definitely, problems that we see with people who have overgrown microbiomes, even if it's the commensal or the so-called, you know, beneficial bacteria.

Yeah. For sure. And and ultimately, I mean, if you have good diversity in your microbiome and a balanced microbiome, you know, a certain amount of fiber is going to be really beneficial.

And I also think that it's kind of like a bell curve. There are certain individuals that they seem to do really well on higher fiber, and there's certain individuals that do really well on low to almost no fiber.

Right. And then most of us are somewhere in the middle, right. Those are kind of outliers. And then some of us, most of us are somewhere in the middle and kind of figuring out, like, for me, I do better on, I guess you could say a little bit lower, a lower Fodmap style diet, and a lower fiber, diet in general.

And if I'm eating too much cruciferous vegetables, for example, I tend to have, you know, worse stools, right? I don't feel quite as good if I'm eating a lot of them.

I can eat some, but if I'm eating a lot of them, I just don't do as well. So it's part of the the diet personalization. That's key. But when we're dealing with really chronically inflamed people, oftentimes pulling out a lot of the fiber, and making it as easy as possible for the, for the guy can be really helpful strategy.

I totally agree. And I think a lot of folks find it very hard to believe it, because we've been really battered over the head with fiber, good fiber, good fiber, good for decades, basically since we were children.

Really. But I absolutely think this is this is the whole idea of taking the client or in your case, the patient, and really understanding what's going on with them and just spending a little bit of time really understanding how they're responding and all the other stuff around.

Tracking diet, I think is so beneficial. Like recently, one client, she had bloodying her stool and, you know, okay, so she she was at the doctor checking doctor basically said, I mean, it's it's pretty bright.

It's probably like a hemorrhoid or something. Nothing I could do. So then we we adopted what she's doing, diet environment, and she, she likes to garden, and she, she eats a ton of, like, leafy greens and kale and and, she, she grows some cruciferous, like, cabbages and just a bunch of, like, fibrous, quite indigestible things, especially when not cooked well.

So I told her, look, I get that you love to garden and you're eating quality vegetables and stuff, but do me a favor. Humor me a couple of weeks, and these, like, days go by and already, like, not no blood in the stool and it just it stuck over the bowel movements cramping.

All these things start to improve. So I think, you know, to anyone that's a little bit incredulous, just have to like, keep an open mind because, like, you've seen these guys that completely remove fiber.

There was one study, like, it wasn't like a huge study of maybe those, like 60 or 80 people I can't even remember now. But you probably know this one is pretty famous.

But they had three groups. One group, they all, like constipated, had gas, this kind of stuff, like a lot of digestive symptoms. So they had three groups, one more maintained on a high fiber diet.

One had a reduced fiber diet, and one had a complete elimination of the fiber. And that group completely had everything resolved from, constipation. They went to, one bowel movement a day from like an average of like four once every 4 or 5 days.

Gas, bloating, pain on defecation went away. Just everything improved. And then the one where they reduced the fiber, they had some improvement, but it wasn't, like, huge.

And then the high fiber group, they just kept continuing having these problems. So I think we definitely have to keep an open mind about this stuff. Yeah, 100%.

And there's a lot of people that are getting really good results. For example, doing a carnivore diet, one of the most well researched diets for people with gut health is a low Fodmap diet.

Or for Fodmap, it basically means fermentable carbohydrates, right? And you think about when you look at the list of all the different FODMAPs, it's all the things that are often touted for having a lot of prebiotics, a lot of cruciferous vegetables, onions, garlic, things like that.

But it's one of the most well researched diets for improving gut health conditions and chronic inflammatory conditions in general. So the low Fodmap diet and then, you know, there's a lot of people that are out there that have had severe gut issues.

Binders, Saturated Fat, and Pregnenolone

And there's another diet called an elemental diet, which is basically like protein shakes with no, no fiber at all. That you're drinking throughout the day for, you know, several days or whatever it is a week or two and seeing remarkable results.

And I remember years ago taking care of a client, and she was a she was a CrossFit coach, right. So she was doing an intense exercise, you know, looked great and everything.

And all of a sudden she couldn't tolerate any foods, even when I, when I put her on a low Fodmap diet, she was still she would have all these rashes and itchiness in her skin and all kinds of stuff.

And finally I put her on this elemental diet where she bought these shakes and she was drinking it. And after about two days, she was like, oh my gosh, I finally have my brain back.

My skin felt so much better. She did it for a week and then she we transition her to the low Fodmap diet and and then on. And she she's been, you know, great ever since. Right.

And so so these are our plans that that do work. Right. When people are doing it right. And the mechanism would be improving that gut microbiome balance and lowering the amount of endotoxin.

Yeah. Yeah. And I think that that's where a lot of folks get value from keto or or carnivore or even fasting, because just fasting alone if you're not eating is.

But especially a person that's eating a very high grain, high bean lentil type diet, you know, with a lot of indigestible stuff that is, you know, they love to ferment.

Those little guys. Just fasting. A lot of people will get benefits by reducing endotoxin, right. So I think that's probably a huge benefit of fasting.

So, with my clients, the closest thing I've ever done to like an elemental diet is just stripping it back down to the bare essentials. Right? So, like, not even thinking about micronutrients for a week, but just butter for fat, beef for protein, really.

And white rice, organic, all organic ideally. And that's like the the closest thing to like an eliminate in an elimination diet. But it's it's not stressful in terms of so you know like if it's carnivore only you tend to get do a lot of gluconeogenesis to, to make up the glucose that is required by, you know, red blood cells, the brain, the kidneys or various other sort of like organ organs in the body will require that glucose.

So we have to do some gluconeogenesis which is driven by cortisol and stuff. So the rice really helps to, to kind of just have plenty of glucose for the brain.

So people not especially, you know, like have a lot of women that come that are a little bit, you know, weaker on the weaker end. They've been suffering for a few years.

So we really have to like if it's a dude in his 30s, he can do carnivore, no problem. But we just have to really look at the client. And how can we make it as easy for them as possible so they get it right?

Some low Fodmap, low fermented. Exactly. Yeah. And not no almost no fiber as well. So really easy to digest. Yeah. Yeah. And provide some bulk right in the system.

And I know like another popular diet is the Gaps diet. And the Gaps diet you know they're using kind of soups broths and soups and typically white rice is in there right.

Yeah. You know bone broth things like that. So yeah. Can be, can be really, really helpful. Let's talk about some other other key strategies for getting endotoxin down.

So I think one of the easiest things actually would be some kind of a binder. I think, even, you know, good old activated charcoal, if you want to get a little bit fancier, maybe some zeolite, maybe zeolite, clean up to the light.

That's a, that's one I really like. But anything really that's a binder that you can take prophylactically I think will help because it's kind of mopping up.

So it could be endotoxin. It could be other bacterial exudates, could just, could just be like dead bacteria. And if if a

person has a leaky gut, if there's increased intestinal permeability, a little bit of a binder every, you know, one, 2 or 3 days, depending on how heavy the case is, you know, would be very beneficial.

So I think that would be like the easiest thing for most people. What's your thoughts on this? Absolutely. In fact, actually the best binder that I've found for endotoxin specifically endotoxins is immunoglobulins.

So whether that, you know, a lot of people, if they have a real severe gut, they may not do great with dairy based immunoglobulins, like for example, colostrum.

However, there's also something called bovine serum. Bovine serum, our albumin which or immunoglobulin I should say bovine serum immunoglobulin BSI. And that seems to work really, really well.

Okay. And that's something I personally take. And I respond really, really well to, all the binders are great and they have different there a different affinity for for different toxins in the body.

Okay. So like some like for example, certain phobic acid humic acids can be really good for glyphosate heavy metals, different things like that zeolite like you were talking about.

And they will also get some of the, endotoxin. But I found the best one for endotoxin is the bovine serum immunoglobulins from my personal experience.

Very good. Another actually another good one is saturated fat. Would you believe it? You know, in if you look in the studies, they say like a high fat meal will increase endotoxin.

But from what I understand, lipoproteins like LDL and HDL and, saturated fat, basically they inactivate, they bind. So LDL and HDL, they can they basically bind the endotoxin, and they carry it to deliver where it can be, you know, neutralized and excreted.

So that's where it gets processed. And I think probably that's why we have so much things like, liver, pathology, like nonalcoholic fatty liver disease and all this stuff is because, you know, we have a, a lot of buffers in the diet, a lot of, you know, inflammation coming from that side of things.

But then you also have endotoxin, which can basically act like, like throwing gas on the fire. In that case, you know, they can, it can having a little poof in the tissue basically can sensitize you even more to the toxin, you know?

Yeah. By poof, you're saying polyunsaturated fats. So yes, linoleic acid, your omega six, seed oils, corn, soybeans, safflower, cottonseed, you know, all those types of seed based oils.

But you're saying saturated fat, getting that from, you know, your your animal products as well as things like coconut oil, has an anti endotoxin effect.

Yeah, exactly. And that's actually what I tell my clients. If you're going to drink, if you're going to have a glass of wine I think maybe that's why the French do so.

Well I'm not sure if it's the resveratrol in the wine, but beyond, they're like, maybe a little bit of wine with a croissant. Or maybe not, but with cheese.

And the saturated fat in the cheese can kind of act almost. It it kind of. I'm not because part of the endotoxin, it's it's label polysaccharide. So polysaccharide polysaccharides a carbohydrate sometimes kind of chain.

So the label part is like a lipid sort of molecule. So it will have affinity for for lipids. So I think maybe that's where the it could be like a structure.

I'm not like a biochemist or anything, but it could be as like a structural effect of the saturated fatty acid where it can kind of bind it. So, so lipids will be able to bind it almost kind of like, like a carrier.

And then that, even though with the whatever ways they're using to measure endotoxin levels, it's there might increase with, with a fatty meal, but it's because they're actually just being carried in the bloodstream to deliver to be.

So they're more, inactivated. Right. So at least I'm not like an expert on, on that specific part of it.

Hydration, Bile Flow, and Liver Detox Support

But I think that's what's happening. And then the other good one that I've seen is actually, it can you can get it in a supplemental form and then alone, which is like the precursor, it's a, it's a form.

Basically cholesterol gets modified in to pregnant alone. And that's the backbone or the precursor to the steroid hormones. So from you know, testosterone, progesterone, estrogen, cortisol, aldosterone, all of those really, can be formed from, from pregnant alone.

So from what I understand, pregnant alone kind of interferes with the, where the TLR four receptor toll like receptor for, is kind of waiting to, for, for the, the toxin to attach to whatever way it's interfering with that, I don't know.

Is it down regulating. Is it putting the is it getting in the way. But it's doing something where it's basically blocking the lipopolysaccharide from attaching to the the receptor, which then of course blunts the inflammatory response of cytokines from the, from the macrophage monocytes whatever immune cell.

So that's another great one that I found to help with. It's more after the fact. We don't want to be really we want to go a little bit more upstream. So we don't want to let the endotoxin be there you know.

So don't feed the bacteria too much fiber. Make sure the gut is healed, you know, lowering stress, all that stuff, cortisol. But if they do get in there, that's kind of a little bit of an after effect.

After the fact type of, I want to say remedy or solution. Yeah. That's good. I hadn't heard that one. I would also add on good hydration is really key.

You want to keep things moving through your body like a river, right? Or a gently flowing stream, rather than being stagnant like a pond. Right. Stag is going to breed more, fermentation, purification and more problems.

Right? So you need to keep things moving. And hydration is key. Electrolytes, magnesium. Right. All of that's key to make sure things keep moving. And I would also add in something like castor oil packs.

And you can actually just and the reason why I use a pack, you can actually just put castor oil like over your liver gallbladder area. It will help dilate the liver gallbladder so the bile ducts and allow bile to flow through effectively.

And bile will actually bind to endotoxin and help move it through your system. Bile is actually what gives your stools a brown color. So that helps with the good bowel movements, but also toxin release and sweeping up these, these, these endotoxins.

Now the castor oil again, you can just put it on there, but it will stay. If you put a shirt over it it will stick to it. So usually you do a pack where it's like a flannel or something like that.

And yeah, there's companies that actually make a pack so you can put the castor oil on because it's a very sticky oil and wrap it around. And usually the best spot to put it, it's kind of right over your right upper quadrant, which is where your liver, gallbladder areas, right upper quadrant of your abdominal region.

They help dilate the bile ducts. But also if you're having constipation, you can also move your pack and put that castor oil kind of in the lower part of like your colon to help it kind of open up and relax.

And that's the effect that castor oil has, where it's kind of a dilator and kind of opens things up. And so that can be

really helpful for improving your drainage, detoxification pathways, colon, liver, all of that.

Yeah. And actually I saw you have on your website a book on the liver cleanse. If if you're going to be doing all that, you may as well throw in a few liver cleanses in there because the bile gets recirculated multiple times a day through enteral hepatic recirculation.

So we are the the liver cells there, you know, neutralizing, transforming, making, toxins water soluble. Then they're getting pushed into the bile. So if you have stones clogging up those bile ducts, you're potentially having these the, you know, estrogen toxins, endotoxin that are getting clumped up into these, bowls that are, you know, snowballing over the decades.

So it's a it's probably it's I think it's a good idea to just purge your bile just even once in a while, because I think there's, like, I think methylmercury, for example, that has a half life of, I think months or multiple weeks or months in the body.

So just getting rid of the bile, enforcing the body to start afresh, to re synthesize it is a good idea in the modern world, because for sure all of us are recirculating some amount of toxins every day, multiple times a day.

So we that that's that's a further sort of, insult to, to our livers, which as we know by the stat, a lot of us out there are having some, some kind of difficulty with our liver.

Christian's Books and Closing Thoughts

Yeah. Super key. I think that's a great strategy there. Now, Christian, you also have written a recent book, How to Actually Live Longer. And of course, you talk about endotoxin in there.

What can what can people also find out in that in that book as well? What else do you guys. I have some so I, I have my own, you know, everybody has a mother.

You have to have your own model. But basically I have my my model of the three primary drivers of aging and dysfunction. So I talk about stress, inflammation and oxidative stress.

And you know, today we discussed inflammation. But when you really these are very much interconnected stressors or drivers of aging and dysfunction. So inflammation will drive stress because, you know, if you're sufficiently inflamed you you will then secrete cortisol because that's your, you know, your body's internal endogenous, anti-inflammatory and inflammation will cause oxidative stress.

So really all of these things are interconnected. So in there I discuss some strategies, on how to basically start lower identifying what's causing stress, inflammation and oxidative stress in your body and how to begin lowering these things promptly and comprehensively.

Basically. Yeah, that's great guys. You guys should definitely check out Christian's book again. It's called How to actually Live Longer, right? So be sure to check that out.

And you also wrote a book about the autism Wellbeing plan. Right. Can you tell us a little bit more about that one as well? Yeah, so I published that one in 2020, in March when the big, lockdowns started happening.

So the launch was not a, it was a bit of a flop, but that was my one of my, a family member, a child, was suspected of being on the spectrum in 2018. And that led me on a journey to start researching and to help to help, you know, to help the his parents help him.

And that led me to just, basically a two year journey of digging deep into the research. And I saw a join some Facebook groups. I saw the, you know, the moms just really struggling, how stressed they were.

So I wrote that book basically for it and just saw that there's this is so, so many people out there need help because

there's so many things that they can do to help their child because, you know, a lot of these kids, they have to have, a lot of gut dysfunction, a lot of constipation, a lot of anxiety, and a lot of other sort of comorbidities that, at least for many people, when they go to like the GP or the or the pediatrician, they just say, oh, it's because he's autistic.

So I was like, no, that that's that's not because he's autistic. It's because this underlay it might as you know, mitochondrial dysfunction, gut dysfunction, endotoxin is an issue in many kids, you know, just infections, dysbiosis, deficiencies.

I mean, just the list goes on and on and on neuroinflammation. So there's very simple strategies in terms of diet supplementation and, just improving gut function that parents can do.

So I teach them about some of the lab tests they can run basic supplementation, optimizing the diet, sleep, all that good stuff. So that was like my I just had to get that out into the world to help to help more families.

Yeah. Yeah. It's an important thing. Autism, particularly for severe cases of autism. You know, it's an epidemic. I mean, there's a lot of kids out there that they have to live with their parents for the rest of their lives.

I'll never a job. You know, a lot of times people are kind of somewhat normalizing autism today, but there are people that are on severe end of the spectrum that, that's not normal. It's definitely not normal.

And you and I both know it's it's it's chronic inflammation, neuroinflammation. And it's something that is lifestyle induced. Right. And the right lifestyle, the right factors getting that inflammation under control, that stress oxidative stress cycle, like you were talking about, can make a huge difference in these people's lives.

So, Christian, you're a wealth of knowledge, guys. You can check them out. Live longer formula.com. Live longer formula.com and check out his books How to Actually Live Longer, where he dives into what we talked about today in a lot more depth, as well as the autism well-being plan.

How to get your child healthy. Christian, any last words? Inspiration here for our audience? Yeah. I just really appreciate you, David. I love what you're doing, man.

You know, you're you're transforming a lot of lives, and, glad to be a part of this. And, wishing you all the very best and told the listeners, you know, get get that, endotoxin under control.

It's definitely, that and the polyunsaturated fat, getting those things out of our diet, out of our lives, super important. And then, you know, getting our guts working.

That's the key. It's like the Hippocrates thing. All disease begins at the gut. The guy didn't have a microscope. He didn't have all the, you know, technology we have.

But somehow that wisdom, you know, the people back in the day knew it. And it rings so true today because, you know, we every day we find out more and more the ways that a perturbed gut can lead to a lot of health problems.

So we really have to take care of our gut. Absolutely. Well thanks again, Christian. And guys. Again check him out at Live Longer formula.com and we'll see you all soon.

Be blessed.