Introduction and Dr. Wahlsu2019 Background

Welcome back to the conversation. Today, we're talking about the mitochondrial role in neuro immune issues, namely multiple sclerosis. And I have with me Dr. Terry Wahls.

I am so grateful to have you back with me again. You know, I have to say, back in 2018, I produced my first summit. You were one of my featured speakers on that summit.

You blew my mind. You blew the mind of all of our viewers. And I'm so grateful to have you back again to carry on this conversation, because the impact that you have in your in the world is massive.

So thank you, Terry, for being here. Oh, thank you for having me. Yes. Well, let's introduce you to the audience who I don't know how it's possible. People don't know you, but just in case somebody's viewing now doesn't know you, you are an institute for Functional Medicine Certified Practitioner.

You're a clinical professor of medicine at the University of Iowa. You actually conduct a clinical trials in the setting of multiple sclerosis and from a functional medicine perspective.

And we're going to get into that and talk about it. And I know you have some trials going on that people can get into as well. So we'll make sure that we share that before we finish today.

Now, in 2018, you were awarded the Institute for Functional Medicine's Linus Pauling Award, and that's for your contributions in research, clinical care and patient advocacy advocacy.

And you're the author of The Walls Protocol. And also you have a cookbook that goes with that. And you literally are everywhere. You have been such a huge contribution in this space.

So thank you. Thank you for continuing the discussion today. Hey, thank you for having me. Yes. Okay. So let's jump right into this, because we're going to talk about how poor mitochondrial function drives the development of fatigue.

People are here to get more energy. We're going to talk about how it affects mood disorders and disability specifically. You know, you specialize in multiple sclerosis and neuro immune issues.

And we know that mitochondria are totally compromised by the way that we live our life in this fast paced Western world. So first, before we jump into all that, you have an outstanding hero story.

You truly do. It's remarkable what you went through in your own multiple sclerosis story. So can you share that real quick? And I think that's a great place to start.

So 20 years ago, walking with wife Jackie a half mile from home, my left leg goes weak, dragging a hobble home. When I see the neurologist, he says, Teri, this can be bad or really, really bad.

And so the next three weeks ago, through the workups and I hear the words multiple sclerosis, I do my research, see the very best and most center in the United States, see their best physician take the newest drugs.

Three years later, I hear tilt, recline, wheelchair chair. Now, I also have tried general neuralgia. Those electrical phase pains have been getting relentlessly worse, despite, you know, taking into with drugs, going to the pain centers.

And that's when I decide I'm really doing all that I can. I go back to reading the basic science. I decide that

mitochondria are what's driving disability.

I create a supplement cocktail that supports my mitochondria and I feel, you know, a little bit better when I take my supplements. Then I discover instead of using electrical stimulation of muscles, I ask my physical therapist, Can I try that?

He says, It's really for athletes. He can grow bigger muscles. Is that true? My brain can talk to those new, bigger muscles. But it gives me a. I. It hurts a lot.

But when it's over, I feel great. He tells me. It's because of all of the endorphins from the release by the electrical stimulation. So we add that to my physical therapy.

I discovered the Institute for Functional Medicine. I take the course in neuroprotection. I have a longer list of supplements, and I've already been on the paleo diet.

After being a vegetarian for 20 years.

MS Diagnosis and the Turning Point

I've been on the Paleo diet for five years. But now I have this really big aha. Like what if I redesign my paleo diet based on all the supplements I'm taking?

So more research, I get that, sort it out. In a December 26, 27, I start this new diet. Now, for context, at that time, I can not sit up more than 10 minutes.

Otherwise, I'm either in bed or in a zero gravity chair with my knees higher than my nose fully reclined back. And that's how I surfed the residents in the resident clinic.

So what I find amazing here, what I've always found incredible about your story, is that you came from a professor of medicine. You came from the Western world, and you thought out of the box, There must be something else.

There must be another way. You know, when I was first diagnosed, I read the research. It was. I just got more and more edgy cause I saw that M. S is a progressive disease, so that within three years most people are not working.

And I didn't know that. So I was very agitated and my family convinced me to stop reading the literature and to go find the very best medicine in the country and see the best person there and follow their advice.

So I gave up all of my control. When I hit the wheelchair, I was like, Well, this isn't working out. I'm going to go back to reading the basic science, right?

And that was a heavy lift because I'm not a neurologist. I don't have a Ph. D. and so I'm reading a lot of basic science, relearned, and I'm teaching myself basic science, neurochemistry, neurophysiology and that it's a big, heavy lift.

So I'm reading a little bit every day over the next four years. And it's really interesting. I came to the idea that mitochondria were driving disability for Parkinson's, Alzheimer's, Huntington's ALS, progressive M. S.

and it really had only had one relapse, maybe two in in the seven years that I'd had the M. S.. Wow. Take us back to that moment where you were because I interrupted you.

Take us back to the moment where you could only be sitting up 10 minutes. You were joking. Sit up for 10 minutes, you know, otherwise have in bed in the zero graph chair.

And if you read the definition of being bedridden, it is cannot sit up longer than 10 minutes. Like, [beep]. I could I could walk. I could walk a few steps using walking sticks and we're talking about remodeling our house to

accommodate my wheelchair inside the house because it was so difficult to get around.

And my boss had just said he was reassigned me. The Traumatic Brain Injury Clinic. And because I worked at the V. A., he could do that at any time. And my only recourse was to say, okay, I'll retire then. But and when he described the job, I knew I couldn't physically do it.

My wife knew I couldn't do it and said, okay, well, I'm going to have to start this new job in January and either I can do it or I can't. I finally have to apply for disability. Wow.

And so it was good time. It was good time. And you know, that's when I added the stem. That's when I came across functional medicine and I took their course a neuroprotection the audio files that were synched with the PowerPoint.

The big notebook of cases. And I was going to have some brain fog. So there was a lot of biochemistry. Again, longer lists of supplements. And that summer I had this figured and in retrospect, I sort of chuckle at how long it took me to have this like, what if I redesign my paleo diet based on all these supplements, all these things that that I've identified as important for mitochondrial health?

And but I redesigned to make sure I'm getting them from the food. I'll still do a paleo diet, but now it's a very structured paleo diet. I start this new way of eating December 26th.

I go to my new job the first week of January, the first two weeks. I'm just watching from my totally clean wheelchair. Then he's hired my nose. And then the third week on that Monday, it's my turn to get up and examine that these men and women write the notes.

At the end of the day, I come home and I tell Jackie, Well, you know that that wasn't too bad, huh? And then at the end of the week, on Friday, I say, you know, it really wasn't too bad.

And at the end of the month, I realize I don't think I can do this. And then at the beginning of February, I tell Jackie, I want to have my meal in a regular chair.

So you took away the zero gravity chair. And of course, mind you, I'd been eating, you know, reclined with my knees higher than my nose. And my family's always worried it's going to choke and aspirate, you know?

And that was a fair concern on their part. So I sat up and I had supper. For the first time. In how long? Oh, probably four years. I take this in every one right now while you're listening to this for years in a tilt recline chair and you have this moment where you're eating, sitting up.

With my family sitting up. And so for years I couldn't go out to a movie theater. I couldn't go to a restaurant. If we drove up to Wisconsin, we drove with me, fully reclined in the front seat with the straps that buckled me in.

And so I'm sitting up for the first time in there, and I don't remember when it was in February, but I think later in February, although it might have been March, I mailed a letter by walking down the hallway, thrill letter with my two walking sticks.

And of course, that stunned everyone because they don't see me do that in about four years. And then, you know, I began walking around the hospital to walking sticks.

Then I begin walking with one walking stick. Then I begin walking with no walking sticks. Then I begin walking around the neighborhood. Now, keep in mind or I because I have a, you know, second progressive M. S.

and I was taught in medical school and residency and by all of my neurologists that when you hit the secondary progressive phase, there is no recovery function.

Functions once lost are gone. And so even though I had remarked as part of the adaptation, as you let go of the

future, you learn to take each day as it unfolds.

And so I was still taking each day as unfold. I didn't know what any of this stuff meant. And I still was not thinking about the future. Right. And there was, you know, getting your hopes up, too, would be a painful thing if it didn't pan out.

So then in April, I remembers about mid-April. I'm asking Jackie, you know, do you think I would try I could try riding my bike, you know, with bike riding was a big thing that my family did.

And she said, well, you know, maybe this fall, if things keep going well, we can get your bike out, because I'd given my bike to my six foot five son.

And a couple of weeks later on Mother's Day, I really want to ride my bike.

Rebuilding Health Through Diet, Supplements, and Exercise

So we have an emergency family meeting in Jackie. My kids don't think I should run my bike because they don't want me to fall and get hurt right. And they're actually almost tearful.

They're very afraid. But Jackie decides that that we can try. So she tells my six foot five football player son, Zach, you went alongside on the left, the 13 year old also, you know, plenty strong.

You jog alongside of the right and you'll follow. We all get in position. You get on that bike and I bike around the block. And that big 16 year old boy, he's quite the 13 year old. She's crying.

And Jackie's great. And I can't tell that story without crying because, you see, that is when I understood that who knows how much recovery might be possible.

And after that, I rode my bike a little every day. In an October, Jackie signed me up for the Courage Ride, 18.5 miles. And when I finished that ride, we're all crying.

My kids are crying, Jackie's crying and I'm crying. And it fundamentally changes the way I understand disease and how the way I practice medicine and the focus of my research.

I've made it my mission to let the world know that you can have hope that even if you feel like you have a devastating disease and your doctors are telling you that there is no recovery, that is possible.

Life exists because of self-correct in biochemistry. Healing is possible. And forgive me, I got to wipe my nose. I always cry when I talk about that. Thank you, Terry. That was so beautiful.

And I'm sure we don't have a dry eye watching, as you said, self-correcting biochemistry. So I want to dig into that. And I know mitochondria are the crux of this.

So they are drivers of disability and you can self-correct. So tell me more about this self-correcting biochemistry. What does that mean? You know, in ourselves, every second there are a million biochemical reactions that happen in a very controlled fashion that we have ranges in self-correcting so that your potassium doesn't get too high, your sodium doesn't get too high, your calcium doesn't get too high.

It's a very complex network. So we have all of us, no doubt. Remember when we were children, we skinned our knees all the time. We cut ourselves and we can very rapidly heal when we are young, as we get older, that that self-correcting healing slows down.

The reason it slows is we have such toxic lifestyles, we have such terrible nutrition, we have such poor sleep, we have such toxic relationships. And if we can bit by bit take all of those environmental factors and move them bit by bit away from a toxic environment, a toxic disease, promoting activities to more health promoting activities.

You'll restore that resilience, that biochemical resilience. Now, I still can't be 18, but you know what's interesting, Laura, is, you know, so I have a progressive neuro neurological disorder, neurodegenerative disorder.

We know that people in my disease that we age far more rapidly than the general public. 10 to 20 years. Mm hmm. So. And I've had secondary progressive Ms.

for ever since I was 45, so 22 years. So we could project and I'm 67 that my biological age should be around 87. And there was a time when I looked 20 years older than my stated it but I've since done knew some biological age markers and I'm 15 years biologically younger than my chronological age.

And that's because I. Like this is profound. I think I am 15 years younger biologically than my chronological age. That sounds impossible because you should be 20 years old or older.

Correct? Correct. So how did you do it? So I know that it's possible to restore, as you just said, and you just it in your incredible story to ride that bike so.

Well, let's just. Go through the sequence of the things that I did. I added exercise in. I knew from diagnosis exercise would be key. So I was always absolutely diligent on exercise.

Then I adopted. The ask you this. Sorry to interrupt, but how so? And you're you're in a reclining chair for four years, I would think your muscles atrophied your bones.

Oh, yeah. So absolutely. My, my, my bones were in terrible shape, but my muscles were. So I put in an endless pool. And so when I couldn't run anymore, I swam.

I swam in really cold water. I did not heat my pool. So it'd be like 55 degrees. So I was doing warm half for a long time in well, I couldn't swim then I did water aerobics.

I and it was 45 minutes and 35, then 25, then 20, then ten. And that's where that at at at the at the lowest point. I and I adapted the Paleo diet actually the year before I got into the wheelchair.

And I think that probably slowed things. I added supplements for my mitochondria. That clearly was very helpful because if I missed my supplements, I could not function at all.

What sort of. So yeah, creatine carnitine, lipoic acid coins and. Q B vitamins. Now gradually I would add more things. And so I have a much more complicated regimen that I take now.

And I still find now that I do have more energy when I'm taking my complicated mitochondrial cocktail and then I the next I had electrical stimulation of muscles and again start out 10 minutes a day.

Then I got to 10 minutes twice a day and then 15, twice a day and then 20 twice a day and then 30 twice a day. On the electric stimulation, were you able to do this at home?

Did you have a device? So I went to clinic three times a week for four years and I had a device at home as well. Okay, great. So I'm sure you teach all of this in your we we take some protocol. Yes.

We do. We teach people how to do this it. And you have to do this at a pace that allows for recovery. If you do it too fast, you lose ground. So you have to work very, very closely.

And the physical therapist that I worked with, a treated athletes and keep in mind, I was a martial artist, sort of a mixed martial arts kick him up sort of girl before medical school.

I so I had I gave concussions and had a few and once it medical school I realized that I should not be doing that anymore. But the the beauty of having been an athlete was I found a teacher who treated athletes, who treated me like an athlete.

And I understood that you train for a long time. That and I'm sure that was very helpful in the willingness to do is stem and I pushed e stem as hard as I could with my physical therapist approval.

Tell us what Eastham is, because I know there's people. Oh, electrical stimulation of muscles. It's different from tents. It's a different set of frequencies.

You put the electrodes over the motor nerves to induce muscle contraction and you contract your muscles and then you have electrically driven contraction on top of that.

So and so that makes nerve growth factors in your brain. Let me tell you, I could tell my brain really loves electro stimulation of muscles. In fact, I still do a couple hours of electrical stimulation of muscles every day, just because my brain loves electrical stimulation of muscles.

So just do it while you're going about your day doing other things. Do you just hook. Myself up and I I'll do isometric muscle contractions. So you still want to contract your muscles?

Well, volitional. So I initiate the muscle contraction on top of the electrically driven muscle contraction that works my muscles, that works the mitochondria in my muscles, that lowers inflammation and the muscles are endocrine glands.

They really improve your insulin sensitivity, improve the health of your metabolic, your blood sugar control, improve the health of your blood lipids as well.

So it and now and I've published research about this now other researchers are also agreeing with me that electrical stimulation of muscles is a wonderful rehabilitation tool for people who have a spinal cord injury that's either complete as in paralyzed or incomplete, weak as in those who have a neuro immune condition.

Hormetic Stress, Recovery, and Mitochondrial Health

And so in my practice, we often use electrical stimulation of muscles to facilitate recovery of function. Then I got into cold plunges, ice baths. As I recovered, I could get into heat stress, heat, heat, a red light, a low level laser therapy, saunas, a fast 160 degrees, which I now tolerate and enjoy.

And when I was ill with my arms, I could not tolerate heat at all. It would cause cause me to be almost blind, actually. So I had very, very, very poor heat tolerance.

But now I'm fine. I can do sinus to 160, I can take hot tubs. That's no problem whatsoever. And I think the key here is that you worked and worked and worked and worked.

At it and made all these changes gradually at a pace that my body could tolerate it. And I would add a new hermetic challenge, sort of one at a time. So we added the exercise in his term and worked closely with my physical therapist to add that at a pace that he was closely supervised, mind you, very closely supervising, because what he was he knew what he was doing was radical.

It was new at first. He said no. I had spent a fair amount of time convincing him to let me try, and he knew that he had he was potentially hurting me.

So he took a big risk in letting me go down this path. And he wanted to keep a very close eye on what I was doing. So as that turned out really, really well, I thought, I wonder if I could take a sauna again.

So I went to a local gym. What? I tried out a sauna and I was stunned. Like, I can see, I feel great. I have plenty of energy. The sun is not bother me.

So I bought a sauna and I started doing science. And, you know, I'm still swimming in my and my pool's really cold during the winter. It's warm during the summer.

And they well, you know, I could sort of explore this ice plunge kind of thing. So now I'm getting some heat stress. Some cold stress. So I want to. I want to unpack here just for our audience who might be new to mitochondria.

What Dr. Walz is talking about is were medic stress and or emesis is very healthy level of stress for your mitochondria and your cells in your body. However, if you go too fast, too much, too fast, you can actually go backwards in your progress.

So you bring one hermetic stressor in at a time. So things like breathing, exercise, cold, plunging, red, light, sauna, even some nutrients. And so this so I want to invite everyone to be be gracious and careful with your body, depending on the level of your chronic health condition.

And you'll be learning so much on this summit about how to incorporate all of these things. But this is core medic stress in action. This is how you brought back your cellular health.

As you say, this is how you self you're self-correcting. Biochemistry was stimulated by this. And keep in mind, I did one thing at a time, at a pace that you can tolerate.

You have your mild to moderate stress. Then you have to have sufficient recovery to be able to let your cells come in, fix all the damage that happened to a little bit stronger function for that cell.

And then you can give yourself stress again. And so my physical therapist was very, very clear about the risk I was taking, you know, during the stamina exercise you would have to cut.

And he was going to take my device away from me if I didn't keep coming to see and follow the instructions. So so. Be coachable. Is the lesson here coachable?

Be coachable, listen. And if things aren't going well, you stop and recover. Yes. So what you're sharing with us is that is 100% possible to restore mitochondrial health.

It is 100% possible to bring back your health. It does take a level of commitment and dedication, accountability and allowing others to guide you and being curious and inquisitive and researching and trial and error.

I mean, this isn't that whole concept of you lived into it. You get to live out of it and and here you are. And I mean, I've had the pleasure of being in person with you multiple times and meeting up with you at conferences and events and no one would ever know that you ever spent four years in a chair?

No. And no one would ever know. I would never know that. I'm dumbfounded every time that I see you in person. So we did touch on quickly. I want to share.

Yeah. Yesterday I jogged on my treadmill 20 minutes. Oh, my gosh. I feel like you're just getting stronger and stronger and better and better every time I talk to you.

Well, my hair is getting grayer, though. Oh, you haven't figured that one out yet. When you do, let me know. You know what I had? When I ran my first marathon, I said, I want to be the gray haired grandmother passing the whippersnappers.

And I thought I was going to have to give that up. I may not have to give that up. We'll see. Yeah, you might just do it. I think I think anything that Dr.

Terry Wells puts her mind to is possible. And if not, you'll figure out a way to make it happen. So we did touch on the what the leading decline of mitochondria effectiveness is and what's causing these problems.

And we touched on toxins, and I wanted to have you explore that a little bit deeper. And now before we adjourn, but in my work with with people, one of the foundation things we do is prepare people's bodies to be able to remove toxins because toxins are drivers of disease.

And once you can get rid of toxins, your cells, your body can regenerate. So let's talk a little bit about toxins. What are the leading toxins and drivers of this mitochondrial decline?

So for me, often blood, mercury, arsenic, cadmium, heavy metals are a big driver. You could also have some bio toxins. A mold could do that. And then our food supply, we have so many foods that have glyphosate in the food, the grain, legumes, as part of the farming practice Clovis site is put on the food crop grains to have all of the grain peak at the same stage, which improves the efficiency of the harvest.

Therefore, unless you buy things that are certified organic, you've got a large glyphosate load. I, i and there's so much pesticides, herbicides in our food supply.

Toxins, Clinical Results, and Lifestyle Medicine

So in all those compounds that I just went through will interfere with the biochemistry of the electron transport chain, which make your mitochondria less efficient, which then make your cells less efficient, which then set you up for immune dysfunction and hormone dysfunction, insulin resistance, metabolic syndrome, anxiety, depression.

And so your first step is clean up your diet as thoroughly as you can go, as organic as your budget will allow. And think about it, filtration system for your air and your water.

Now, having said all of that, I do want your audience to know that I when I was working primarily at the Veterans Affairs Hospital, we created a therapeutic lifestyle clinic where we saw the sickest of the sick.

Most of those folks were living on food stamps. They'd been unable to work, usually for years because of their disability, in teaching them how to basically do the walls protocol, the diet and lifestyle, their use for my recovery.

And they're not buying organic foods. They're just getting their food from local, small grocery stores, quick trips in Little Town, Iowa, little town, Illinois, little town, Missouri.

And we saw dramatic results. Now you'll recover more quickly and more easily. If you can go organic, you can do those things. Yeah, but even if all you can do is just do it, you can afford.

Given your circumstances, I predict you'll be quite pleased with the progress you can make. I'm so glad you shared that because you know, the cost of functional integrative medicine, you know it's a higher standard of care than Western medicine.

It is not covered by insurance. In most cases. The supplements are an investment, the food is an investment. And it's so fantastic to hear that you have seen people improve and get better with the resources that they have with what they can do.

Yes, correct. Dramatic. Well, they grabbed Matic and then Theo was really lovely. The V. A. has no chronic medical records, so we could see what happened to their blood pressure.

What happened to the blood sugars, what happened to the medication list? What happened to the hemoglobin agency? And so I would have to go and reports to the executive team every three months.

And it was very impressive that narcotic use was down, blood pressure, medication use was down, blood sugar medication use was down. But the agencies were better.

The lipids were better. And, you know, I would go to the pain clinic, especially medicines that give me your most difficult cases. I'm not going to I'm not going to be using drugs.

I may be reducing their medications. So we don't cause hyperglycemia and hypertension. I got a few, had success, then get a few more. Then we had a deluge.

And so I kept having to reimagine how I ran my clinic to accommodate the demand. So we went from one and we quickly went from small group to large group.

The classes and then the central office came out to see me and I thought, Oh dear God, I'm in trouble now. But, but you know, they were actually very impressed and took many of the concepts that I was teaching and add that to the whole health clinic.

So that so well, what I'm hearing from all this conversation too, is that even if you don't have M. S. or another neurodegenerative disorder, this is going to help it's going to help your energy.

It's going to help if you have autoimmune conditions, it's going to help brain fogginess. It's going to help. I mean, your protocol helps no matter who you are.

You want to become superhuman. You're already doing great and you want to get better. Do the what's protocol? Yeah, you know what we saw? Because people would come with chronic pain, with autoimmune issues, a wide variety of medical problems would get sent to us.

But the common symptoms were pain fatigue, a brain fog. In then nearly all of the men had low libido, erectile dysfunction, nearly everyone had obesity.

And in the first three months, blood pressure was better. Blood sugars are usually improving medication, and the guys would come back and say, Hey, doc, you didn't tell me.

Didn't tell me that, you know that you know, things would get better with with with the girl, you know? You know that my love life is back. Terry, you had a major marketing mistake.

You should have just led with that. So. So the men sort of group classes, the more senior guys would be sort of, you know, letting the new the newbies know that this was definitely a thing that they could look forward to.

And then the the the ladies also really quite interesting. They're really pumped because they're losing weight without without being hungry. Yeah. And when you talk with them, they're often also acknowledging that their libido has improved and the men often lost weight without being hungry.

Current Research Studies and How to Get Involved

And so classically men are much more interested in performance and women are more interested in appearance. Yeah. Now that's not universal, but it was a very common observation.

So good, so good. Well, you do have some research studies going on right now that people get into. So tell us about that. How do you get so excited? We are running a study comparing a ketogenic diet paleo diet to usual diet for people with relapsing remitting multiple sclerosis between the ages of 18 and 70.

You would come to Iowa at month zero, month three months 24. We get measures of some survey measures of mood fatigue, quality of life, and then we have clinical measures of walking hair and vision function.

And then the thing that I think will be most interesting in the study is we're getting research MRI's of brain volume at Mansoura in month 24 because for people with relapsing remitting M. S as a group, our brains are shrinking three times as fast as happens in healthy controls.

Well, and that's why we have much higher rates of early job loss, cognitive decline, early frailty in early nursing home care. And relationship decline.

All everything goes to show. So they can get. How do they get a hold of what? Well, what explains that? In my clinical experience, brain fog resolves.

We're very optimistic that we can get brain volume loss to healthy aging. Now sign up for this go to Teri Walls dot com tr y walls w h ask.com. There is a gold bar across the top and you can click there, take the survey, answer a few questions, and then we can begin the process of getting you enrolled, even if you don't have relapsing M. S.

If you have progressive Ms.. Complete the survey because we are writing grants to add progressive AMA studies. Oh, wonderful, wonderful. And I know you're really active on Instagram.

I follow you. You really open up your life and show what you're eating, what you're doing, how you're exercising, all the healthy things that you do. So how do they find you there?

So that's Dr. Tara Walls, the RTI are y walls, WHL us great. And it's been an absolute pleasure. It always is a pleasure to be in your company. I really you are one of my heroes.

I will also tell you, because of you, I'm eating liver. I found a very delicious meal. How to make it? Well, I found a way to do it. I found a company that mixes ground beef with liver.

So it works very well. Yes. So then I just make whatever out of it, saute it up, make burgers, make put it on salads and I'm getting my liver and it's a little bit hidden in it.

And it's actually quite it's more of a psychological thing. It tastes good, but it's a mental thing. Well, you know, you'll have to come to my house so we can show you how delicious liver can be. I know.

I would. I would. I would love that. So next time I'm in Iowa. Okay, that's a that's a bargain. Sounds good. Well, thank you so much for being here and sharing your wisdom and being such an inspiration for our audience.

Much love to you and your family. Let's take good care now. Bye bye. Bye.