Introduction to Dr. David Jockers

welcome to another wonderful interview for the missing Autoimmune Summit. I'm, Doctor Terry was your host. And next, we're going to be interviewing Doctor David.

Joggers. He, has a doctor of natural medicine. He runs one of the most popular health websites, doctor joggers.com, which has over a million monthly visitors.

His work has been seen on the doctor as show the hallmark home and family. He's the author of the bestselling books kiddo, A Metabolic Breakthrough by Victory Belt and The Fasting Transformation.

He is a world renowned expert in the area of metabolic health, fasting, brain health, inflammation, and functional nutrition. He is in the front. Host of the popular Doctor Joggers functional nutrition podcast.

And, I'm just so excited to, interview, doctor joggers. Okay, doctor jokers, I'm just so excited that we're here together. So just just get right into this. No.

Why is fasting so powerful for restoring the microbiome and revitalizing, our stem cells?

How Fasting Supports the Microbiome

For sure. And so, you know, I always say fasting is the most ancient, inexpensive, and powerful healing strategy known to mankind. It's ancient because all of our ancestors did it.

They didn't have refrigerators and pantries. They were dependent upon a good hunt or a good harvest. And that didn't always happen. And so they had to fast out of necessity.

And so our body knows how to handle fasting. It knows how to deal with it. In fact, we're actually better equipped to deal with fasting than we are feasting.

And so, so fasting just built into our genetic blueprint, obviously doesn't cost you anything, so it's very inexpensive. It's actually saves you money as opposed to you know, many other health strategies.

And, you know, it's incredibly powerful and it's powerful on the cellular level, but it's also powerful on the, on the overall system level. We're talking about the gut.

And so, you know, in, in, in, in research, you know, we talk a lot about the gut microbiome and how the bacteria and the different microbes in the gut play such a huge role in our overall health.

And that's absolutely true. And you know, most when when most researchers talk about how do we benefit the microbiome. There are a couple things we talk about.

We talk about obviously removing inflammatory foods, removing ultra processed foods, seed oils, things like that that cause a a poor microbiome balance. Right.

So they preferentially feed bad bacteria. And cause really, you know, issues obviously with the microbiome. But recently we discovered how fasting actually impacts the gut microbiome and what fasting does.

The way to understand how fasting works is we have to understand the two different layers of bacteria in the gut microbiome. So we have primary feeders that live above the gut mucosa.

So the intestinal lining is like a long tube. And on top of that tube we have mucosa. So we have mucus right now mucus is actually where the immune component of our body is.

Right. And so when when if you were to ever ask you know and people will ask where is the immune system in the body. Well it's actually in the mucosa.

And so, you know, in the gut that's 80% of the mucosa of the mucosal membranes are actually in the gut. And so that's where Secretary IGA and these different healthy immunoglobulins live.

And and they help to, you know, get rid of pathogens and bad microorganisms. Doctor John, because I'm going to stop you just for a moment. IGA our listeners may not know what that is.

Yeah. Secretary IGA is an immuno globin. So immunoglobulin immunoglobulin A right. And so we have immunoglobulin G immunoglobulin and there's multiple different immunoglobulins.

Most of them are just released into the bloodstream. They're part of the immune system. And they're the way the body will actually target pathogens and adapt to the exposure to pathogens.

Secretary IGA is one that actually sits and lives in the mucosa, so it's in the mucus. So when we produce mucus, like if you're if you have a cold and you're producing more mucus, your body's actually producing more secretary IGA in order to, protect you from, you know, potential pathogens.

And so that actually is in the gut, and it helps protect the gut lining. And so there's bacteria, good bacteria that live in the mucosa. And there's bacteria that live above the mucosa.

The ones that live above the mucosa have the first. You know, they in a sense they have, the priority when it comes to food and so because they're above the mucosa.

So when food comes in they get to eat. At first we call those primary feeders. The ones that live in the mucosa are secondary feeders. So food polyphenol and different fibers have to actually seep deeper into the mucosa for them in order for them to eat it.

Now they can also survive just on eating the mucus itself, right. Like we have one that's been pretty well studied. It's called Aquaman's mucin. Ofelia mucin Ofelia means mucus loving and more researchers have shown is that people that have healthy levels of Aquaman's mucin, Ofelia have lower levels of all different types of metabolic and inflammatory, conditions across the board.

And so, this kind of bacteria is really healthy. It is a obligate anaerobes. And that's actually really important when we understand the gut as well, meaning that, it cannot survive in an oxygen based environment.

And typically in our gut, particularly our small, small and large intestine, we have very little oxygen. The further you go into the gut, like further down the small intestine and into the large intestine, the less and less oxygen you have, as opposed to, you know, we need oxygen, obviously, in our blood, right, in order to produce energy in ourselves.

But in the gut, we want actually very little oxygen. And so, the aker manja does really, really well on, on different types of polyphenols, but also in order for Aquaman's yet to be able to feed and other other, you know, other of these secondary feeders that live in the gut mucosa, that we actually need to trim down the primary feeders from time to time.

And so when we're constantly eating every few hours, we are actually overfeed eating the primary feeders, and they start to replicate out of, you know, basically they start to populate too much, which, does not allow the secondary feeders the environment they need to thrive.

And so the way that I look about at this is, is in my yard, I actually have an apple tree and the branches on that apple tree, they grow quickly and they crowd out.

I have a blueberry bush that's like literally almost like right under the apple tree. It's maybe, you know, ten yards away. But the apple tree will actually crowd out sun from getting to the blueberry bush.

And so every year we actually have to pay somebody to, to go up and trim the hedges of the apple tree or we don't get blueberries. And so we have a choice.

We can either have apples or blueberries, but we have to trim back the hedges, meaning limit the amount of apples we're going to get in order for us to also get blueberries.

It's kind of the same in the gut. We actually need periods of time where we're not consuming food to trim back these primary feeders. So the secondary feeders have the environment they need to be able to thrive.

And when we do that, we get a diverse microbiome. And that's really when it comes to microbiome. We want great diversity, and we want a high amount of these obligate anaerobes that survive in a very low oxygen environment, like like Ackerman's.

Yeah. Because these are the primary butyrate producers. And butyrate is one of the key short chain fatty acids that supports the mitochondria, throughout our whole body, but also particularly in the inteiro sites, in the, in the intestines.

And that helps strengthen the mitochondria, strengthens and creates more stress resilient mitochondria, more strength stress resilient intestinal cells, which reduces the risk of leaky gut syndrome and, chronic inflammation.

So let's talk about what fasting means. And how long do I have to fast? Because I know many of our listeners are used, because for years we used to say, have a lot of snacks, eat throughout the day, you know, three meals, 2 or 3 snacks a day.

So people have heard this message of continuous eating, because maybe they have episodes of, quote, low blood sugar. But you're telling us that we should fast.

So how long should I be going without eating? Yeah. For sure. And so all of us have fasted because we all sleep at night. And so, you know, from the time you go to bed or really the time you eat your last meal to the time you eat your first meal, that's in a sense, it's a fast.

Now, how should we set this up to where we're getting really good benefits from intermittent fasting? Well, I recommend doing at least 12 hours overnight between your last meal and your first meal.

How Long to Fast and What to Eat

That's kind of in a in a sense, it's like the minimum amount to just allow your gut to start to reset, to allow your liver to undergo and basically process and detoxify, you know, various things that have come in through the bloodstream and just give your organ system, a chance to, to rest.

So 12 hours overnight. But ideally, you know, some of the more popular methods are things like a 16 eight where you fast for 16 hours overnight and you eat in an eight hour eating window.

Right. And other people will do maybe a six hour eating window. You got to find what works best for you. Now there are some tips to help you stabilize your blood sugar.

And this is really kind of the the preliminary steps. Right. So you want to do these are prerequisites to be able to have a healthy fasting experience.

Number one is get rid of the highly ultra processed highly in slow genic foods the crackers, the chips, all that kind of stuff. When we eat that, our blood sugar goes up, our insulin goes up, and we end up telling our body that we're a primarily a sugar burner and we stop fat burning.

And so between meals, if we're going too fast, our body needs to move into fat burning and so we need to get insulin down below a certain threshold so we can burn fat for fuel.

So we got to reduce the ultra processed foods. We really want to prioritize protein in our meals. And so I recommend eating 30 plus grams of protein each meal.

And for some people, that seems like a lot. Once you get used to it, it really isn't that much. You know, 4 to 5oz of, of meat. Typically we'll will give you, 30g. Right.

And so you want to get at least 30g of good quality protein if you're very active you might need more 40, 50g, in a meal. And that will help keep you satiated and stabilize your blood sugar.

You also want healthy fats in there, which typically most protein sources have healthy fats. In some cases, you might be eating chicken breast. In that case, I recommend adding in some, fresh pressed, highly high polyphenol extra virgin olive oil on there, which is a really great fat source, or maybe some avocados, some avocado or guacamole or something like that.

So you get some healthy, healthy fats on board with the protein. And then also fiber, right. So you can get your fiber from, from good quality fruits and vegetables.

When you consume meals like that, that's going to help keep you satiated. It's going to keep your blood sugar stable so you don't have big spikes and drops and big releases of insulin, and then that keeps you satiated.

So you can go longer periods of time between meals. And that's really the key. So I recommend the first step is set up your meals. Right. Like I was just talking about eating real foods high in protein, getting healthy fats, getting lots of colorful fruits and vegetables.

Kind of the same stuff that you talked about. Doctor balls. I mean, you teach, you teach this so well, and then basically that alone will create blood sugar satiety or create blood sugar.

Stabilization and satiety also hydrate well between meals. And that really helps. And then that will stop you from snacking right. So you do that and then you eat three meals a day like that okay.

And don't worry about, you know, how long you're fasting. Once you get that down and you don't really feel hungry now. So I'm going to stop you for just a moment.

So we're talking ultra processed foods. It's sugar sweetened beverages and, flour based products. So I think in cereals, breads, pastries, desserts. As you mentioned, crackers.

And so instead of having those, flour based products, we could have fruits and vegetables, non-starchy vegetables. What are your thoughts about tubers?

You know, potatoes, tubers, squashes. Absolutely. So for somebody that has good blood sugar balance, I think tubers can be really healthy. If you're active and you have blood sugar, stability, eating some potatoes or yams or sweet potatoes, there's some good nutrients in there that can be really healthy.

For somebody that struggles more with insulin resistance, I recommend not consuming those either. At least until you get blood sugar stability down and really just prioritizing the protein and the healthy fats.

So it really depends on the individual, how active, how insulin sensitive, their body is to begin with. But I think that they can have a place, you know, they are real foods or things that are ancestors.

Eight I think they definitely have a place in a healthy lifestyle, but it just, you know, we always want to personalize it based on the individual and where they're coming in from.

Okay. Now, so we we've reduced the flour based the sugar stuff we're having now, plain non-starchy vegetables, berries, and depending on your insulin resistance.

And how would people know if they if they have insulin resistance? Yeah, it's a great question. That's a great question. Without getting any sort of lab testing, clearly, you know, you can test your fasting insulin if it's, you know, if you fasted 12 to 14 hours overnight, you get your blood work done and your fasting insulin is up over six K, that's a sign that you have insulin resistance, some level of insulin resistance.

You want it between somewhere between 2 and 5 or usually 1 to 1 in five. You want to know your body's producing it, but you don't want to be producing it too high.

Now, outside of that, outside of knowing that, cravings are a big issue, right? So if you're having a lot of cravings, sugar cravings after meals or between meals, you know, that's a sign that your body is in this sugar burning mode.

You're you're producing a lot of insulin if you have belly fat, if you look down, you know, if you look straight down, can't see your toes, if you have a protruding belly, that's a classic sign of insulin resistance.

Insulin will cause you to store more body fat like that for for men, you might have low testosterone males when they have insulin resistance, especially as they age, they end up with low testosterone, which can cause low libido, low muscle mass, it can cause issues of motivation, mental health issues for women.

It can cause, insulin resistance can cause PCOS. Polycystic ovarian syndrome is really common. Large appetites oftentimes where it's like you're eating and then you still have a sugar craving.

It's like you've you've eaten a lot of food, but you, you just you still feel like you need something quick. You need sugar at the end of the meal, something sweet at the end of the meal.

And so those are all kind of classic signs of insulin resistance, oftentimes really tired after meals. Obviously that could be a digestive issue. But but often it's associated with insulin resistance as well.

When your body produces a lot of insulin, it's it's going to cause you to not feel very energized. And if you can't get the sugar into the cell, which is why you're producing that insulin, you've got a lot of food.

You know, you've consumed a lot of potential energy, but you're not actually turning it into, real cellular energy. And so you can feel tired. Oftentimes it's like almost like a burden on your system after you eat.

And so anyways, those are kind of classic symptoms of insulin resistance. If you've been diagnosed with prediabetes or diabetes, that is a insulin resistance based disease.

Right. And so, so those are all the kind of your classic signs of insulin resistance that's the first step is working on blood sugar stability. So prediabetes is there a definition.

According to the blood sugar or the hemoglobin I would say that would tell people they're at that pre-diabetic risk. Yeah. Yeah. I don't I don't have it memorized, but I believe it's like up over 100.

Your blood sugar, fasting blood sugar up over 100. And I believe the, a1 c is 5.7, a 5.7 and above on the hemoglobin A1, C up to six five and six five.

And then your dad's diabetes. Diabetic. Exactly. Diabetic would be, fasting blood sugar. 126. Now, whenever I look at fasting blood sugar, I always want to pair it with your insulin levels, because I've seen people with a fasting blood sugar of 104.

Right. 110 even. But their insulin is two, right? And so they were having a dawn phenomenon where their blood sugar elevated. Right. Or maybe they were just having stress about the blood, you know, getting the blood draw. Right.

Or maybe they had caffeine that morning or something like that.

Recognizing Insulin Resistance

That could have elevated their blood sugar temporarily, but they're actually very insulin sensitive. And so that's a good thing to look at. And you can also look at continuous blood glucose monitor, a CGM, which I know you've talked about.

And that can be really helpful too. So you can see how your body's responding to the foods that you're consuming. So and see if you're getting spikes.

Not everyone will know what is CGM or continuous glucose monitors. You know, explain that to your audience. Yeah. So it's just a little device that measures your blood sugar continuously.

That's why it's called continuous glucose monitor. And so if you're testing it continuously, basically all you have to do is you have an app on your phone and it's on the back of your arm.

It's it's painless to put in, and it has a little sensor that's in your bloodstream. And you just kind of match up your, the app, you know, on your arm with, barcode on the, on the, the sensor.

And it will give you your reading right there for, for blood sugar. And so you can test before meals, after meals, after eating certain foods. You could test your blood sugar in the morning.

So at any time you don't need to go in for a blood draw, you could be looking at your blood sugar and how it responds all day long. And then there's different graphs that it will also display to show you.

Okay. So now you can actually see throughout the course of the day okay. Here's what really went up. Oh it went up when I exercised. Right. Oh went down here.

And so you can actually see how your body's responding to different things and you can find unique things. Right. Like, I remember when, when I was looking at it with my wife for her, she would eat.

I think it was honey and honey didn't, didn't cause her blood sugar issue. But then when she ate maple sirup, her blood sugar went way up. Right? So it kind of spiked for me if I had too much coffee right?

Like I could drink one cup. But if I did two, boom! My blood sugar really jumped up a lot. And so it kind of helps you personalize how your body, you know, the kinds of foods that you're consuming, the kind of habits that are going to help you, function and thrive and keep your blood sugar stable.

Yeah. You know, and it can be very helpful to see that I, how I structure my bill if I have protein and fat first. And then I, eat. So I eat my meat first, and then I have, my salad and berries.

That's a different, glucose response that if I eat my salad, and yams first and then I eat my meat. Absolutely, absolutely. You know, there's a couple reasons, actually. That's a really good point.

You talked about eating your protein and fat first. That will help stabilize your blood sugar has been proven. And research is eating protein. Before eating any sort of simple carbs like so if you're having berries or fruit or something like that better at the end of the meal, but also even from a digestion perspective, our body starts producing stomach acid and stomach acid.

You know, based on gravity. It's going to concentrate more towards the bottom of your stomach. So if you fill your stomach up with a bunch of green leafy vegetables or whatever it is, vegetables that need less stomach acid to break down, and then the meat goes on top right, it's not going to be as concentrated.

So actually it's helpful for digestion to to get the protein in because that really needs if you're eating chicken or red

meat or something like that, that really needs more concentrated stomach acid.

Get that in the stomach. It drops to the bottom. Stomach acid, it's really concentrated there. It's going to help metabolize, break down those proteins, help you absorb the minerals B12, you know, help you break down the proteins into amino acids that are more digestible.

And then you're eating your vegetables. And that's kind of it needs less acid. So it kind of goes on top. And then that whole bolus moves into the small intestine, stimulates bile release.

So it's actually better for digestion to, you know, we haven't talked about mitochondria yet. And is fasting. Does that have any impact on our mitochondria for sure.

And really anything we're going to do to impact our health is going to impact our mitochondria. So when when we look at the health of our overall body, it's going to be dependent upon the amount of the amount of high functioning, stress resilient mitochondria in the cells of our body.

And so mitochondria are basically the energy factories within all of the cells of our body. Right. And so they produce all the cellular energy. But they're also like the brain and nervous system of the cell.

They can actually adapt the amount of energy they produce and the amount of oxidation they undergo based on the needs of the environment. For example, you know, if they're if we have a high toxic load or if we have a high viral load, they will actually decide to shut down their energy production and turn up oxidation or rusting.

And we feel this right, like if we ever get the flu, like I remember, you know, a month ago I felt a great like one the day before, I felt fantastic. Tons of energy felt really, really good.

The next day I woke up. I had zero energy, right? And it was like, okay, my my body was undergoing what we call the cell danger response, where the mitochondria were actually saying, okay, I have this viral load.

Blood Sugar Monitoring and Meal Order

These viruses are actually in the cells replicating. I need to shut down energy production, and I need to, produce more oxidative stress, which is the precursor to inflammation.

What did I have a joint, you know, like my back hurt, you know, you feel achy when you had the flu. And so that was all this cell danger response. And some people get stuck in the cell danger response.

For me, it was a few days. And then I felt great again. Right. And so my cells I was able to reduce that viral load, get it under control, and then my cells turned back on and went back into peacetime physiology.

And so with your mitochondria they are sensing the environment. And they're saying, okay, should we be in a peacetime physiology or are we in war time physiology when we're in peacetime physiology, we're going to use a lot of energy, which makes us feel great, which which makes us feel mentally clear, because the brain is the most dense area for mitochondria outside of our reproductive organs, the ovaries and the testes.

The brain is the most dense area. And so when you have good mitochondrial function, you have good memory. You feel energetic, you feel creative. You just feel really good.

You feel feel like you can produce at a high level. And when you don't, you notice it. Your brain fog, right? You can't remember things. You feel lethargic and sluggish.

It's all a sign the mitochondria aren't functioning the way that they should. And so mitochondria are really key for for all functioning in our body. Right.

And I mentioned earlier how certain types of bacteria produce post biotic compounds that actually support the

mitochondria in our intestinal cells. Right.

So just kind of touching back on that the intestines are what separate the outside, just like the skin the outside of our environment from the inside.

And so the intestines are this tube. But it's only one cell, right. One cell lining all the way through. And when that cell lining starts to break down and become damaged, we call that intestinal permeability or leaky gut syndrome.

And now large undigested proteins, bacteria, bacterial waste products will actually get into the bloodstream and cause drive up inflammation. The body will feel threatened and drive up inflammation.

So the mitochondria, the health of the mitochondria, those intestinal cells are one of the key factors for keeping the intestines stress resilient and from breaking apart, keeping those tight junctions strong.

So going back to how fasting impacts the gut microbiome by allowing for the proper production of proper, colonization of these secondary feeders, we get more of the post biotic production that then, enhances the mitochondrial function within those and parasites.

So that's one of the ways that fasting improves mitochondrial health. Fasting also when we're going period time without food, our cells need to continuous supply of energy.

So they can produce they can use energy from they can get energy from glucose sugar or they can get it from fats or ketones. Right. So all of those things.

But they also we also need proteins. We need proteins because we're constantly turning over all the different organelles within the seller proteins. White blood cells are proteins. Red blood cells.

So we need a continual supply of proteins. And so for fasting and we're not getting those nutrients. The body has to find other means. When it comes to energy.

We have stored sugar in our liver in our muscles. We call that glycogen. So we can release glycogen and we can produce energy from that. We also have stored fat.

All of us have stored fat, even lean people like, you know, Doctor Terry and I, we have stored fat. We can go, oh, you know, a week with just the stored fat that we have in our body and produce energy.

And so we're breaking down that fat. We're utilizing it for energy. Now, the proteins where the protein is going to come from. Well, actually this is this is what's amazing about our innate intelligence.

The body knows what parts of the cell are older and perhaps more damaged, right or senescent.

Fasting, Mitochondria, and Autophagy

And so senescence is kind of a term for aged aging and functioning the way that they should. So when insulin gets real low in our bloodstream, that kicks on our innate intelligence to say, okay, we're in a time of healing and repair.

And it kicks up this process called autophagy or self-heating within the cell. So we then our body will actually start to the cell itself will start to break down old damaged proteins and actually recycle the raw materials, the amino acids and form new healthy proteins, new healthy mitochondria, new healthy, you know, proteins throughout the cell that are needed to carry out the functions.

So and these are just strategies stress resilient. Yeah. Not for just a moment. So I want to restate that for our listeners. So when we're fasting we could use fat, and we could use, ketones.

But our bodies look to our older, not well, working proteins within the cell, and we digest those proteins and we

manufacture them into newer, better working cellular structures.

So we have newer, better working mitochondria. And basically what I'm doing is making my cell younger, healthier, more vital by that process. Yeah, absolutely.

It's it's cell recycling. So we're yeah, we're breaking down the old damaged proteins, turning them into new healthy, stress resilient proteins. And we we talk about the mitochondria.

Yeah. The term we use is my top AG. So it's this form of autophagy self eating specific to the mitochondria. And I talked about earlier how the amount of high functioning stress resilient mitochondria, meaning they can undergo stress and they can still thrive under that stress.

A unhealthy or a senescent mitochondria can't handle stress. They break down. They're they're not able to function well. They're not able to adapt. So we want highly adaptable mitochondria that can handle that stress.

That is going to give us the highest quality of life. Now, what I as listening to you, I think I want to highlight for the listeners this is part of why this continuous feeding is so harmful to us.

If we eat throughout the day, we have late meals into the evening. It reduces the amount of time that my cells get the signal to go through this, cleaning process.

For my cells. And I don't have as much time to basically make my mitochondria that are young and healthier. And that's probably true for many of the other cellular structures that we haven't talked about, that that are happening.

Yeah, absolutely. I mean, you think about it like in your home, like if you're just continually bringing groceries into your house, but you never actually take the trash and the recycling out, right?

You're just gonna have trash and recycling built up all over your home. I mean, it's going to stink. It's going to bring, you know, flies in, rats in, you know, it's going to be an unhealthy home, mold, all kinds of stuff.

And so clearly, we all understand, okay, we got to bring groceries in once or twice a week, but then we also need to bring out the trash and recycling.

You know, to our curb. So the, you know, the trash man can pick it up. And that's just part of having a healthy home. And so, it's kind of the same with our body.

We need to undergo periods of time. Our ancestors underwent feast and famine periods, meaning they had periods of time or food was abundant and they ate well.

And when they did that, they told the body, okay, food's abundant right now. That's actually good. That tells us to produce the right amount of sex hormones.

It's good for, you know, fertility, reproduction, all that kind of stuff for anti-aging, even, you know, getting the right amount of estrogen, progesterone, testosterone helps us really thrive in life.

But we don't want to be in that food abundance period for long, right?

Closing Remarks and Resources

So we also need to spend a good amount of time in this sort of famine cycling where we undergo this autophagy might haffajee the cell renewing. And this kind of cycling back and forth is really helpful.

And that's what we want to undergo. So this is when we talk about fasting. We're not talking about a long period of calorie restriction. We're not talking about okay you need to eat, you know, 800 or 1000 calories every day for the rest of your life. No.

That's terrible. That actually, that puts you in a prolonged state of famine, not healthy for your metabolic system. Instead, this is a period of time where you're eating sufficient calories.

The calorie needs that you need in the macronutrients that you need. But then you're also going periods of time with very low amounts and you're cycling back and forth, which is kind of gives your body the stimulus.

It needs to clean and repair, but also then to produce the right amount of thyroid hormone, sex hormones. So you can really thrive. Okay. Well, this has been a marvelous, marvelous information that, I think our listeners can use to really fine tune their self-care.

In, really improve their nutrition. Now, David, doctor jackers, can you tell our listeners where to find you? And I see you have a copy of your book over your shoulder.

So great resource. I love the book. Recommend it highly. But again, where can people find you and learn more about, everything that you have to offer?

Yeah. For sure. My website, doctor jackers.com. You can find me on YouTube as well. And my podcast, The Doctor Talkers Functional Nutrition podcast. I've got a great book on fasting.

It's called The Fasting Transformation. So you can check that out on Amazon or wherever you get books as well. Okay. Marvelous. Thank you so much. Doctor Jacobs.