Introduction to Amy Dirksen

Hello everyone. My name is Doctor Richard Horowitz and I am your co-host today of The Doctors Talk Healing from Lyme Summit. And it's my great pleasure to introduce you today, Doctor Amy Dirksen.

Doctor Dirksen is a competitive athlete and naturopathic physician with a full scope of practice in Washington state since 2003. She's an undergraduate training in biochemistry, and we're going to be discussing some of those really interesting biochemical pathways with Amy along the way that many of us, I think, would be confused about.

And she did her undergraduate training and postgraduate training with Doctor Clean Heart. She has additional training and pans pandas. A she's trained with eyelids, mold genetics, methylation LDA LDI really kind of a broad range.

So Amy, tell us a little bit about yourself and how you got into Lyme. And in fact, even why naturopathic I, I get it as an MD because I had to learn the naturopathy approach.

But why don't you just tell us how you got into all this? Oh man. Big question. So, you know, I always thought when I was growing up that I wanted to be a surgeon, but I have terrible hands, and I was actually pretty sickly myself.

I was I was an athlete, I was I had a ton of energy, but I would get pneumonia every year and miss, you know, a couple of weeks of school. So anytime I was sick, I was on antibiotics.

You know, my family just didn't understand the broader range of things. I was put on, things that gave me stomach ulcers and all sorts of things. And so when I was in college, I had an injury.

You know, their solution my senior year was okay, more ibuprofen when I tore a hamstring. And I guess you're not going to run again. And I turned to an alternative book and found out I was deficient in calcium and magnesium and took the cheapest supplement I could afford because I was totally broke.

And within three days, after three months of pool training, I was back to running again and feeling good. And so I realized, you know, there's something more out there and I was lucky enough to have a class in college on alternative medicine, and it blew my mind to even know it was out there because I hadn't been exposed to that.

So I was fortunate enough. I lived in an area where Bacteria University is and had that as my my original thought was to go there, just get an understanding of what's contributing to illness.

Right? So it's not about the diagnosis, it's about why are you sick and what's the big picture? And that really fits with how my brain works. And so it's been fun. Detective work.

The 20 years of my career, I was really fortunate. I started with Doctor Dietrich, Clean Heart. And so I didn't have to retrain how I thought about medicine.

I just got to think how he thinks because he was my first exposure. So you see someone, it doesn't matter if you're rolling in in a wheelchair or you're running in, across the finish line.

There are layers that were all impacted by. Right? So that's that's great. And by the way, I like affectionately to refer to myself as an M. D., also as a medical detective, because ultimately, what most of us end up having to do is to unlearn these illnesses. Right?

It's it's not about the classical medicine approach of name a disease, throw a drug at it. It's really about layering it into the component parts to figure it out.

Right? So, right. So so today's topic, which I think will really be helpful for people, we're going to be talking about solutions for chronic fatigue.

Right. And those who are suffering from Lyme and associated illnesses. And it's perfect for you because. Right. You've I also, by the way, loved biochemistry.

My medical school in Belgium was two years of functional biochemistry. Wow. Yeah. So I actually wrote up on the walls I had colored pens. I don't know if you did this.

How Amy Got Into Naturopathic Medicine

I was writing out all the Krebs cycle and all of the stuff in pens and colored pens, and so I could memorize it that way. I write it all out, and I loved it.

Also, I thought it was absolutely fascinating. So. Oh yeah, I blew up a big chart on the wall and had it laminated so I could write little notes of like, okay, where the nutrients fit in and all of those things.

So great fun. Another I appreciate you. No, no. Of course. So so tell me a little bit, how does chronic fatigue and Lyme differ from other chronic fatiguing illnesses?

How do you think? Where are you seeing the differences and and the different approaches of what we have to take care. You know, I don't it's just exaggerated.

Right. So a lot of times when you're dealing with Lyme disease, it's been this fatigue that came on sometimes out of nowhere or it's crept on really slowly.

You feel older than you are. You know, that's usually one of the first complaints. If someone hasn't identified that, they've, you know, been dealing with a chronic infection, they're just like, I don't know, something's wrong.

My doctor tells me I'm fine, but I am so tired and it will ebb and flow. Typically your your baseline is more tired than they used to be, but there definitely tends to be a more cyclical pattern to it when there's an infection related.

Right. And by the way, and that's an important one because the symptoms coming and going with good and bad days is really the hallmark right of of chronic Lyme, where you would expect maybe with long Covid, you're not going to have that same cyclical nature as much. Right?

Because maybe the mitochondria get affected. So they're tired every day. Right. It's a little bit of a different clinical picture. Definitely presents a little differently.

So again you know, when you're thinking about it you're just looking for those clues. Great. And the markers are indicators right. That that someone's fatigue is due to Lyme versus right.

And we're going to talk about all the different forms of inflammation of where people get sick and the downstream effects. But what are the markers? You look for yourself when you're trying to figure out if someone has Lyme disease, if they have Lyme disease.

So I kind of see this as two questions. You know, when you're looking for if someone has fatigue, it doesn't matter if it's Lyme or not. I'm always looking at some basic labs like a homocysteine level.

What's the size of the red blood cells? Is the MCV on the big side there might be a methylation issue. There. Is the cortisol really low or is it sky high.

So are there hormones totally in the tank before they you think they should be? Maybe that DHEA is crazy low. For a lot of women, progesterone is dropping and cycles get weird line markers.

You know we can look at a CD 57. We can do fancy Lyme testing. There are other people who will be talking in the summit who definitely will be focusing on that.

So that is where your detective work comes in. And I think looking for some of those markers is important. You know, is it an IG or an exam or kind of what level of inflammation are we seeing.

So you can do a CRP level, a said rate, some of the cytokines if you want to be fancy, but there are labs that you can do that are covered by insurance, which can be really nice.

Right. Do you do you tend I mean, I think a lot of the doctors who, work with these kind of patients do use genic laboratories. And these are immuno blots generally view I mean, for us it's pretty much first line.

And of course I have no financial, you know, relationship with them. They're just a great lab. But what I usually tell people is I play Lyme bingo where, you know, bingo.

Any one of these following numbers 23 usb-C, 31 Usb-a, 34 USB 39, 83, 93 bingo. You've been exposed to at least a Borelli A species, right? So then I just have to figure out if it's due to that.

And do you see the migratory pain? You know, when I when I published my questionnaire years ago, we found migratory pain was associated with Lyme. Whether it was muscular joint, you know, or it was nerve pain.

Do you do you find that in your patients too? Yeah. I saw that more ten years ago then I'm seeing now. I'm seeing more static now than this migrating pain.

Oh, but I'm also on the West coast and my I'm a last stop for people. I'm not a first stop. Right? So I'm not tending to see the acute Lyme. I'm tending to see the person who already knows they have Lyme and they're stuck because I do a whole system of muscle testing and everything I learned from Doctor Climate to figure out, okay, what else is going on here?

But the definitely the weird. I just think of a young girl I'm treating right now. And the biggest clue because we're trying to figure out with her is this a head injury or is this Lyme disease, right.

Because she has these really severe headaches. And then all of a sudden she started having this migrating body pain. You're like, oh, all right, this is live.

And this isn't the head injury. Right. And of course, I'm sure you see the same thing. There's no one in my practice who comes in with one thing wrong with them.

Right? The analogy I use is you go to a doctor with 16 nails in their foot and tell the doctor you have a foot pain, and the doctor takes one nail out and says, come back in a month and tell me how you're feeling, right?

It's not world. It's usually multiple inflammatory triggers and multiple downstream effects, right? Yeah, absolutely. And especially as time goes on. You know, I was just reading Steve Harris's book that he's about to publish, and he was even talking about how much more difficult it's gotten in the last ten years.

And I've seen the same thing, like there's layers and layers of inflammatory issues and a lot of gut issues that I'm seeing becoming really exaggerated that I feel are are contributing to this.

What are the gut issues specifically that you're seeing in the practice or the immune issues that you're seeing that that are affecting that these chronic fatiguing patients? Yeah.

So the biggest change I've seen because I you know, as an empath, you know, we talk poop immediately. That's just how it goes. And so I've been doing stool testing for 20 years now.

And it used to be really abnormal to have an an abnormal IGA level. So normally you think of IGA slow. We're

seeing leaky gut. Or if it's really high I think of it like this overactive immune system response.

And you would rarely see that. But now I rarely see anyone in the normal range. So that's telling me, okay, our immune system is really activated or suppressed.

You know, there's a multitude of things that could be contributing to that. But clearly it's happening. No. And we see exactly the same thing. In fact, I would say almost every patient now coming to us has leaky gut and food sensitivities with some ACL activation.

I don't run the GI map, you know, as much or Casa, but but certainly I'll see, you know too much prep tell or clostridium or not enough at Kermanshah.

Chronic Fatigue and Lyme vs Other Illnesses

Do you run the GI map or CD? Say you're finding some of those helpful? I am finding them helpful, but it depends on someone's budget as well. So if they can't afford to test like that, there's a lot of tests you can do.

Just a stool test with LabCorp or quest looking for like how protecting and white blood cell count and, you know, eosinophils in their stool. Just to get a general idea, you can do cluster idea markers if you think if there's all of a sudden aggression that seems to be going on.

I do like the GI map. It does paint the picture for me. And I would say that IGA level tells me a lot, especially if it's early in my treatment. If that idea is low, I know I need to boost that gut immune system and overall their immune system.

I also just look at a CPC is that white blood cell count low, or does it tend to run high? Because if the IGA is high, I know I need to down regulate things for them, right?

I'm not going to use mushrooms and immune stimulants. That's going to like completely backfire on us. Yeah. You know and and also because you brought up Covid earlier I mean we're seeing in some of these patients I don't I wouldn't say earlier on in my career I was checking natural killer cells, T-cell, CD4, CD8.

But you know, now we regularly check them as well as checking immunoglobulins and subclasses. And and there's clearly, you know, the Covid overlap at this point is definitely making things a lot trickier because even though many of the patients do get treated early, you know, with Paxlovid and all the things we do with glutathione and, you know, we can talk about some of that nevertheless, I mean, I think the viral overlaps are becoming much more difficult now with fatigue because you're getting Epstein-Barr reactivation in hives.

You're also seeing those kind of viral reactivation. I'm seeing a lot of varicella activation as well. So if all of a sudden if someone's symptom during Covid, was that like shooting pain or if afterwards they're just having this deep burning sort of pain, it's very likely varicella that we've seen activate it.

I've seen a lot of influenza getting activated as well even if someone wasn't exposed. But I'm definitely seeing Epstein-Barr with the fatigue getting reactivated for people.

So so what is the panel? I mean, because we're talking today about addressing the chronic fatigue, which is why obviously one of the worst symptoms that people have.

So, you know, when I think about it myself and you mentioned it earlier, I'll always check the hormones because the HPA axis gets downregulated. Right.

You can get the adrenals that are lower, sex hormones that are lower. Many are getting pots right. Low blood pressure from both Covid and from Lyme. But but we're also seeing, of course, that I'm seeing a lot of parasites with BBC and I'm seeing Bartonella.

Right. It's it's really becoming almost like every factor these days seems to be causing fatigue. So how how do you kind of do your checklist when you're seeing the patient for the first time?

How do you how do you look at that? Gosh, that is a great question and could be a whole class in and of itself, right? Where do we where do you start with the chronically ill patient?

I think the most important thing is you do a thorough intake and you listen to their story and you really listen to their symptoms, and that you don't go in with goggles on thinking, okay, this is Lyme, this is Lyme, Covid or whatever this is, is that you really listen to the whole picture.

Are they attempting to do some exercise? And they're wiped out for three days. That's probably a mitochondrial issue. Are they do they not handle oxidative stress at all.

Do they try ozone. And it blew them out of the water. Did they you know, do they not handle antibiotics. Do they not handle some of these things. Just really listening to that picture?

I tend to run labs. So I really love an organic acid test, which is a urine test because it'll look at markers of yeast and bacteria in the gut. It will look at our methylation markers.

So all of our good B vitamins, it gives me some good mitochondrial markers. It will look for markers of ammonia and oxalates, which are two things that can really contribute to symptoms brain fog, pain.

It will look at glutathione and toxicity markers. So one quick little urine test especially I tend to treat a lot of kids. So it's nice if we can avoid a needle can give me a ton of information.

So a lot of times we'll order that before they even come in. And then I like just start with standard bloodwork that that is covered by someone's insurance.

Because as we all know, this gets incredibly expensive to to deal with. Right. Because a lot of times people aren't able to work. And then you have all these supplements and medicines and co-pays and it just adds up really quick.

So there's a ton of things we can look at. And I'm happy to share my list of of labs that we can get into that a little bit later. Yeah. No, we'll, we'll get to that in just a little bit.

And you know, and you brought up a really important point which you know, we as health care practitioners know, but 90% right of the answer is always in the clinical intake.

And you said it like if someone says I take antibiotics and I'm a lot worse than well, the question is, was that a Horkheimer reaction? Or maybe you have Candida right in your gut and you're and you're flaring it up because a lot of these patients who've been on chronic antibiotics, they have a candid issue.

We find maybe 10% when they're done with antibiotics, we clear them out for use and they go, oh my God. My fatigue and brain fog was, you know, not from the Lyme or the Bard anymore than actually from Candida, from the Candida. Right.

Or mid-morning or mid-afternoon, doc, I start yawning, I get really tired. Well, are you metabolic syndrome? Is your blood sugar swinging? Right? It's it's taking that history. Right.

That really is already a day. Sweats night sweats, chills. But present. Right. So so you're right. It's it's old and I don't know how long your intakes take.

But usually when I see a new patient it's hours. Right. Yeah. To get that into my first appointment for me is usually two hours. And we are rushing to get through that.

Yeah. Right. Right. So no I think it's important now the, the, these organic acid tests I mean I know there's a lot of

labs out there and unfortunately in New York, like the old test and some of these like I can't always get what what labs do you like for the organic acid test?

Oh, it used to be called Great Plains. It's now called mosaic. So that's been by far my favorite of the organic acid tests. And the only one I use. Yeah.

So it's, you know, I'm wondering in New York, I know they've got this thing called any lab test scam. I'm wondering if my patients try to. Have you tried getting it?

Sometimes when patients can't get it from, like, whatever state they're in. You know, I've had the luxury of, you know, I fly under the radar and I'm in Washington. Right.

So as an Indian that you get a lot of things and I just carry them in my office and send them to people. I don't have a lot of patients from New York.

I have patients from all around, but not a ton from New York. Often they'll have an alternate address. I should put that on video. But, you know, often they'll have a something else that we just put in this as their base address, if that's, you know, where they're staying.

Right. So there there it is. But any lab test now is something to look at. Direct labs is a place that often people can order their own. So I would I would check both of those because they're adding things all the time. Great.

And when you pack these organic acid profiles and again, these are like specific biochemical pathways. When you see these abnormalities what kind of nutritional supplements.

Because you do a lot obviously with nutrition and diet. Right. Can you just give us like a rough idea of what kind of responses you're seeing like 1 or 2 examples?

Oh my gosh. Well, I mean, it depends what shows up there because sometimes, you know, you run an organic acid test and it is a hot mess. Right. And so, you know, it's great because, you know, there's a lot of things you can do to help this person.

If it comes back and it's completely normal, then you're like, oh no, this is just the infections.

Testing for Lyme, Inflammation, and Gut Issues

We got to target that. So, you know, first page of that comes back a lot of yeast and bacterial markers I address those first. Right. Because if there's a ton of dysbiosis, if they have Lyme we're going to have to go after that.

But the treatments for Lyme are just going to trigger that just biases more. And that, you know, they think 80% of our neurotransmitters come from our gut.

So if we haven't put out that fire first, they're not going to tolerate any treatments. And so, you know, if these markers come up, you know, we might look at like correlate and salinity acid.

We might look at digestive enzymes. Sometimes there's just feeding that. We might look at cutting back simple carbohydrates and sugar in the diet. Or we look at prescriptions I like.

I'm a huge fan of Diet Lukin. You know, we went around a roundtable once of like, okay, if you get five things to take with you on a deserted island, what what medicines are you taking?

Dave Lukin is was one that we all said we would take. So, you know, it has its own immune modulator as well. So there's a lot of other benefits for the bacterial stuff.

Sometimes we can do, sometimes we can get away with probiotics like the spore based probiotics are fantastic.

Seeking help makes, probiotic histamine acts.

You can look at around Gnosis species or just before this stuff. It is tends to calm the system down. And to keep in mind that not all probiotics are created the same.

I mean, you know that. But, you know, for every when we're talking to you, if you taller, if you've taken one and it really triggered you, that doesn't mean you wouldn't tolerate others.

But they are microbes, right? So like a lot of my pans pampas kids, they don't tolerate probiotics at all because it just triggers those funny immune reactions.

I think we'll get into later, like some of the other markers for methylation. So some of the B vitamins and mitochondrial things, we can dive into that.

And some of the treatments that I really find helpful for that any I'm sure people, by the way, are going to have questions after they listen to you, because obviously you've studied biochemistry.

You have a really broad knowledge here. How can people get in touch with you and do you have any upcoming webinars or seminars or things you want to share with people that, yeah, I'm actually working on a training platform so that it's probably more than a year out for that because I yeah, I'm working with Doctor Talia Hill, and we're trying to train physicians and patients on the big picture of things, because there's only so much you can get out of a, a patient visit, even a 3 or 4 hour visit with your doctor.

There's so much intake and there's there's only so many things that they can educate you on. You can reach me. So holistic Healing arts.org is my website.

So you can see lots of information and get scheduled with me there. Is how to find me now. Right. Thank you. All right. So let's let's dive back in a little bit again because, you know, I think because of your expertise again in biochemistry and pathways, it's interesting to kind of look at these markers that show up on on these organic acid tests.

So for example, you may not always see, for example, lactate in pyruvate and ammonia. We're talking about them right. Mitochondrial dysfunction. So there's a difference of course between inherited and those people who actually just get too much free radical oxidative stress from tickborne or from viral infections like Covid.

So can you talk a little bit about those markers and maybe nutritional supplements, things you like. And then we can maybe go through some of these pathways like the methylation and stuff, to just tell people some of the supplements that you found can be helpful.

Yeah. So okay, so let's start with that. So the markers for mitochondrial issues versus oxidative stress is that what you're asking is mitochondrial issues.

You know a lot of times you can check if you want to on bloodwork you can check a cell carnitine. You can look at a plasma amino acid level is a really nice one.

And look at the alanine to lysine ratios. Those can actually give you quite a bit of insight there, even if everything's in the normal range. Like you were saying, lactate in pyruvate.

They tend to be the the points that back up. Right. So if those are high, we already have some indicators there of what's going on. And those do show up more that in specific acid tends to show up more on the organic acid test.

And even for those of you who don't know, biochemistry, an organic acid test especially so not one that you would order from just kind of a standard lab or LabCorp quest, those sort of things.

But one of the fancier panels, it really will lay it out for you nicely. Like it'll give a whole visual section of

mitochondrial markers and you're just looking in general is the pattern that all of your markers are falling out of the normal range, like they're looking high.

So they have this nice little band, right? Of that two standard deviations from the mean. And if you're like tend to have a lot of markers outside of that, you're already thinking, okay, this is mitochondrial stuff.

Symptoms that are going along with that are really poor recovery right? A lack of stamina, sometimes loss of muscle mass, but really that sometimes I see air hunger with that.

But you just are wiped out. You do a little bit of something like I, I personally went through this recovering from Covid is you take one step forward and then two steps back.

You know, you attempt to do a little something. You get up and take a shower and then you are wiped for days sometimes. And so that's a mitochondrial thing.

Simple treatments for that a l-carnitine is so helpful. Okay. So the thing I really learned, and I think this is a good tip for people to know, is when you're addressing mitochondrial issues, mitochondria are greedy, right?

They're in all of the cells of our body. And so if you're taking something by mouth, the first cells to get that gut and then anything it comes into contact with.

So you have to make sure you do a high enough loading dose to actually replenish the, the mitochondria in the adrenals, in the nervous system and the rest of the body.

That really would have the impact on and in stamina and in energy. And so I learned early on, you know, I read about all these things. I put people on acetal carnitine or some of the research nutritionals products.

And I was like, man, they're not working because I wasn't dosing high enough. And so I typically tell someone if they're going to start it, it is a commitment.

And we want to make sure we stick to taking it daily and going high enough. So on carnitine, you may have to tiptoe into it because someone who's really depleted might feel more depleted.

When you get it started. I'm sure that you've seen that. And so, you know, I might start with, you know, 500 or 800mg a day, but I may work them up to 3000mg a day.

There is a prescription Karna tour that sometimes is covered otherwise. Okay. Can we talk name brands I think yes, yes of course. So designs for health there is.

You know L-carnitine is my go to. It's a little more expensive, but I've got to say that that one has worked for whatever reason. It's an 800 milligram.

I typically like to get people up to three. So normally two in the morning, maybe one midday. The other thing is CoQ10. And I find our line patients, they are so oxidative stress because mitochondria are vulnerable to oxidation. Right.

So that's what's hard on them in the first place. I do 400, maybe even 800mg a day of CoQ10 with people. By the way, that's the dose I'm using also that I'm finding good. Yay.

So that's it's exactly. And and at least 2000 of a C a low carnitine. If they're eating some red meat, you know, they're getting some carnitine anyway from it.

But yeah, no I'm tending to go higher on it also. And I like the design for health know, I also use the, the middle GnRH. I've been using that one with the nicotine side right beside.

I've been using that one. Yeah. And even the metal prime from Zimmermann that helps to regenerate glutathione. I found that for some people I think it's help.

Yeah. This I'm again products for mitochondrial health have always been really good ones over the years. A little more expensive but definitely effective.

And that's the thing is, sometimes the price is worth it if it's going to work, rather than just say you're pouring like lots of stuff into your body.

The coke I like is research nutritionals. They have that Coke ten power, which is 400mg each, a pill that's pretty easy to swallow. That one seems to work really well.

I think of coke you ten also with a person who tends to get headaches, like if they've done ozone therapies and they get a wicked headache afterwards.

CoQ10 is a really great rescue for that, right? And the only place I have to be careful with it is if they're on Metron or Malon, and I'm treating Busia because it's the CoQ10, right?

It interferes with the pathways. Right? Right. And so typically with that patient, I'm sure you do the same thing as I load them up on CoQ10 before they would start that therapy.

And if we have to take a break because, you know, for a couple days, even sometimes I load it up, then drink break. By the way, do you do you find the ribose cardio?

Do you find you know, using ribose also makes a difference in some of these. Ribose can make a big difference. It's not my first step but often a second or third step.

Ribose cardio. So you're referring to that product from Research Nutritionals. Yeah it's a good one. So sometimes a little gut stuff with it. So I see some loose stools at first.

So I just with any of these things usually I start a little bit low and have them work up over a week or two. Just give them a heads up.

Mitochondrial Support and Energy Supplements

You know, might loosen your stools at first and then your body gets used to it. But the ribose definitely helps. I like to do that before any sort of exercise and exercise might look like, okay, you're going to go to the grocery store today.

That might be your version of exercise, but whenever you're going to start to push yourself, the ribose can definitely help. Alpha lipoic acid is also incredibly helpful for some.

We have to be careful with someone with that, like heavy metal load like that. That may mobilize some things, but for most people, alpha lipoic acid is also been really helpful.

No, I mean, the beauty is it regenerates glutathione by 30%. It's fat soluble, water soluble, and and it regenerates mitochondria right along with exercise, resveratrol.

And I mean it's a bunch of things that to help to regenerate you've used your old within and a the new one the new kid on the block that's going to come out.

Oh I have not. So yeah. So yeah. So it just started to get released. I mean there's part of the microbiome with the bacteria seem to produce it in some people, but in some they don't.

And, we were speaking to Doctor David Perlmutter just recently on this. I did it and David actually is starting to use

it. Himself. And I take, by the way, I take all these mitochondrial supplements myself because they're now showing it's associated with Alzheimer's disease and Parkinson's.

And I must as I'm getting older, it's like I still need my brain. I want I don't mind if I swallow another, you know, 5 or 6 supplements. It's already 70 per day.

It's like, who cares at this point, right? Yeah, yeah. So where do you get that product and how do you dose it 500mg twice a day as is the usual dose.

And it there's a couple of brands online that have it. But but it seems from what I've been reading about from Cara Fitzgerald and David and others, it's kind of like it seems like in some people it may be a little bit of a boost sometimes when they're not getting enough help.

Yeah, there was a product called K-Pax that's been good for a few people too. It's just said, you know, they had done some research trying to think I think it's integrative therapeutics that makes it.

There was some really great research. They had actually developed their mitochondrial product based on, an HIV med that was suppressing mitochondria. So there was a ton of funding into that.

And that product I still use it. It seems to happen. So so let's go on to the next, pathway, because I think, you know, revolving around the organic acid test is actually perfect for our conversation because I don't think many doctors are really using it.

In fact, I only use it on occasion. And my talk with you today is actually convincing me, even though that the majority of my patients do get better with the way I'm approaching it.

But it's like, that's the beauty of doing these talks is it actually checks off boxes like, oh yeah, oh, you should I should be doing this more often, especially.

So let's talk a little bit about the methylation you talked about 16. You need some B6, B12, folic acid to talk about the methylation markers. And clinically what do you see.

There's this question and I don't see it so much. And I don't know why I am never really over methylated. I don't believe my patients are not getting anxious.

But when I'm doing DAPs on, I'm using massive doses of folate and I'm not getting these people saying, oh my God, I'm, you know, I'm I'm crazy. I'm so excited.

It's like, do you see a lot of over methylation and, and what do you do for it when you do see it. Yeah. Good question. So I saw a lot more over methylation early on in my career.

And I haven't seen as much recently. So over methylation if you think of your big methyl donors. So methyl B12 so that version of B12 methyl folate more so then colonic acid and even B6, those can be your main methyl donors.

And what people will notice with that when it does happen. Because I have seen it, is you do it and they feel so anxious. Like I remember doing this with my former nurse and we gave her an AMD B12 shot before she was ready.

I thought she was ready and she didn't sleep for a couple days and she was just like on edge. I'm like, okay, so we need to learn this. And luckily I was studying with Ben Lynch at the time, and so the tricks for it because you would think, okay, binders, all that stuff and it doesn't work.

Potassium so plain potassium not as an electrolyte but as like a potassium citrate. So I would do maybe 100mg 2 to 3 times a day. Or you get someone regularly on electrolytes or just a single potassium a day.

If they tend towards that. And then niacin is a really great rescue. And they make a nice and so nice and we think of we want the flushing type. I'm not looking for that flash.

So if someone is over methylated niacin is going to mop up those methyl groups. And it's not going to cause a flush. So seeking help makes a little 50 milligram lozenge, or at least they did.

Otherwise you can stick to maybe like 100 milligram. And you can take that every half hour until that the over methylation feeling goes away. And then your clue is all right.

This person isn't ready to handle these methyl donors. They probably need B1, B2, maybe some adrenal help, probably some zinc and probably some magnesium.

And then you revisit it and I bet they'll tolerate it. Or you could try like hydroxy B12 is a great one to start with because it's not going to have that methyl donor so that you can start to push those doses.

And you could even do B12 shots with hydroxy and maybe like acid, but you know, and we we used so I used a combination of kalinic acid and Martha Foley when I do the DAP zone protocol.

But, you know, of course, the tough part about figuring out and I don't think I'm over methylated is that you get hurt timer reactions while you're doing the DAP zone protocol.

So of course people get more fatigue and more headaches and more pain. And if they're anxious, of course, some of the underlying psych issues come out.

It's it's a little bit tough to be able to differentiate it. Oh are you what markers would you be able to see on these kind of tests to tell if someone's over methylated and early.

So it's not going to be a marker on a test. It's going to be their symptoms. So over methylation they take something within a half hour. They feel like oh my gosh, what have you done to me.

Like you had a million cups of coffee and you don't know what to do with it. It is that clear. There's no test that's going to tell you that. I would say for most people, don't be afraid of over methyl lighting because just like you said, you don't see it.

I rarely see it. And I work with a really sensitive group of autistic kids. A lot of times who we tend to see that, you know, a lot of people talk about our genes and all of that.

So many of us are impacted. I've actually gotten away from doing a lot of the genetic testing for that, because I know methylation is compromised. Our folate cycles are compromised like most people benefit.

You know, I'm good friends with Doctor New Brand and he does the methyl B12 shots and then high doses a full intake. And he was saying, you know, the results were the same regardless of my high bar status.

You know, I'm actually in the same place. I used to do them all the time. I don't tend to do it as much. And even the problem with the homocysteine is I get it on everyone.

But I don't know why the labs, they don't love paying for it, even though it's a really marker. At least LabCorp quest I have to like we have to petition the insurance companies.

Come on. Had any issues with that getting covered? I'm wondering if that's Washington, because boy, in New York, when I'm doing it, they're pushing it back and making me say, listen, they've got cardiovascular risk factors with blood pressure, cholesterol.

I need to know, you know, in fact, my homocysteine was 16. This is like 20 years ago and figured out I need more methylation. So I came down to eight and it was like, okay, you know, we're we're in good shape.

But I didn't know it. And still I started checking it myself. Yeah. So homocysteine. So the other thing you might want to look at is negotiating directly with LabCorp for a cash pay price.

I think I got our price down to I don't know if I'm supposed to say, but like $16 or something for a cash paid. Oh, I'm I'm going to have to check that out because we are definitely struggling with them sometimes to get it over.

Yeah. So I'm happy you can have your staff reach out, because we just went through a whole negotiation on some of these things, like markers like TGF beta one and some of those to really get a cash price.

Because I had a bunch of people as a natural path, I can't I don't get coverage for anyone of Medicare age and so it was ridiculous. And so we had to negotiate these catch prices.

And it doesn't take a lot of money. Can we can we talk a little bit about now maybe the phase one, phase two liver pathways on these testing and like are you checking glutathione in in the blood.

Because I have I've seen it actually low in in some especially in the Covid patients who've gotten worse. You want to talk a little bit about phase one.

Phase two and what testing you like or what supplements you're using. You can talk about that and just a little bit on methylation before we just focus on the B-12 is the folate is really important.

So sometimes starting you want a methyl for later for clinic. You don't want a product with folic acid. So I would say whenever you're looking at like a multi b look at the form of folate in there, that's going to be your tell if this is a quality product or not.

It should be methyl for later for clinic. Otherwise you know the other ones are competing and blocking the good folate from crossing that blood brain barrier.

But B2 is also a key ingredient. B six can be tricky to tolerate, but is also key. I really like Thornes methyl guard plus, so if someone's tolerating those methyl donors it has B12, folate, B6, B2 and that's been a good one.

B two is going to make the urine crazy yellow. So just be warned of that. You're not you're not dying. The other thing is just on the B vitamin front is B1.

So the fat soluble B1 B2 for timing in high doses maybe 100 and 200mg twice a day. They call it the gateway to the mitochondria, but it's also so good.

I've seen it for speech. I've seen it for nerve issues. A lot of those. So if someone's really struggling on that and if they're homocysteine. So an ideal blood homocysteine is between 6 and 8 right.

So if it's higher than that and especially if like yours was 16, I've seen people coming back to their homocysteine. 30. Right. I know that that's driving cardiovascular inflammation.

I know they need B vitamins before they need really before they need anything else. Like that whole body pain, the feeling horrible.

Methylation, B Vitamins, and Detox Pathways

If we can get the B vitamins right. And a lot of times I'm having to do B12 shots, which I do subcutaneously every three days. Over time we're seeing a huge change.

So okay liver, liver phase one and phase two detox pathways. So I got away from doing a lot of blood tests for glucose iron because I was struggling to get that covered.

And the lab I was using at the time, it just took forever for the results to come back. You know, you can always look

at on a chem panel alt if it's elevated, you know you need liver support, but it's normally not going to show up like that.

I usually just look, I can look at that organic ask the test again are there needs for glutathione. And glutathione is amazing. You know, you don't need me to tell you.

I'm sure every other doctor you've interviewed has talked about that, but not everyone tolerates glutathione, so we may had to do a step back to support those those liver detox phases that are building glutathione.

And so I really like designs for health amino detox. It's all that phase two Libre detox support a little tiny bit of glutathione NAC is actually tolerated really well and really important.

In the era of Covid helps with some of the lung issues and those things too. So high doses of NAC can be really helpful. Good old milk thistle is helpful as well.

Thorne's SRT product is really nice. Himalaya Liver Care is another one that's been really helpful. And then the other thing I also look at is bile flow.

Because a lot of our patients dealing with mold or bio toxins or any of these things are not excreting those toxins. So if you're someone who works and just stays stuck in a you don't tolerate anything, we've got it.

But, you know, promote that movement out. So they might need ox bile. They might need digestive enzymes with like pace. You might want to start doing coffee enemas or castor oil packs to get some movement going.

You might have to cut back on fat in the diet and really kind of spread that out and do these little meals throughout the day, or do something like intermittent fasting just to give it a phase of rest for the digestive tract to occur.

Could be really helpful for that. Neural therapy can be really helpful for that. You know, there's a lot of things I'm sure. What do you like? Yeah. I mean, we all approach it differently.

I mean, I've, I, you I like the Midcaps tpo, the dual phase optimizers from Xamarin because it has a lot of these things in it. And one I will use the test.

So they make a liver protect from Xamarin. And I've been on the board and I love their products as they're all pharmaceutical grade. But of course all the ones were mentioning, you know fine and designed for help than ortho molecularly.

I mean, these are all great products, right? I'll even use some dim sum die and methane. I use right. And sulforaphane glucosinolates for phase one and phase two.

Because I don't think anyone's getting it enough of the cruciferous these days. Right. Considering the cancer rates, there was just an article that young people are now coming down with dual cancers right at the same point in time.

And it's kind of like the cancer epidemic we're seeing. It's like all these environmental toxins getting in. I mean, this is not just genetics and people.

And we know the viruses and bacteria contribute to cancer too. So yes, I mean, these are things even myself, right? I'm I use these things on myself to, to just keep unloading and hopefully in the wintertime, a little bit more foreign for medicine is right to unload the toxin levels from.

Yeah. Those are the ones that I like myself that I found kind of easy and helpful. I check out Pure Encapsulation Stim Detox. It's my my supplement love affair of the last probably six months.

I use an N or M dim detox. Oh dim dimmed I am detox so it has a lot of the other support with that. Really great for hormone balance, really good for liver stuff.

I'm finding because I, you know, I r t test everyone. So most people are testing for that product over others. But I'm seeing really nice responses and a low dose like one pill twice a day.

Great. Any other pathways you think that are important as we're talking about again, fatigue. I mean, you know, it's interesting when I, when I work the 16 point M sites map and when I do it and I think of it this way, that I talk to people about six rivers of inflammation and ten downstream effects.

So, you know, the rivers would be the infections bacterial, parasitic, viral, you know, fungal microbiome issues, leaky gut. You're not sleeping. You don't have enough nutrition to deal with all the chemicals mold is showing up now.

Just about everybody right, with heavy metals. So those are all like inflammatory factors with downstream effects including mitochondrial and pots and hormone dysregulation.

Liver functions go off neuropsychiatric issues. Right? I mean, so that's kind of how I think of it, you know, in my mind and and of course, all the autoimmune reactions we find once we address the underlying inflammation, a lot of the autoimmunity just get better.

Now, you yourself were mentioning you you've had some autoimmune issues, right. And oh yeah. So I have Hashimoto's. I was a big mess following Covid and still haven't fully recovered.

They have come a long way, right? I'm holding a conversation really well. I'm not having to follow notes. You know, it's great. My brain has come back.

I'm able to exercise again. So some of those things that had really gotten compromised. But the autoimmune stuff is pervasive, you know, and I think a lot of times it does start with the gut, but all of these factors that I'm Ahmadi, I'm seeing a lot of cancer are showing up just like you are.

You know, in younger and younger people, are people having their second type of cancer that really isn't related to the first type. It's just this is it's alarming.

So anti-inflammatories or something to think about, whatever we can do to calm down the system is going to help someone to feel better. So sometimes we have to try and dampen the fire a little bit while we figure out what's stoking the fire.

So things like curcumin can be really helpful. I use a lot of low dose naltrexone. I don't know if you do as well every day. Okay. I take it myself. So does my wife and I tell almost every patient, and a lot of times we do it in the morning.

So it doesn't interfere with sleep, you know, on an empty stomach. If they can take it at night, it's great. But no, I take full. I've been on 4.5mg of LDN for years.

And, you know, especially lowering down the microglial activation, knowing that it's related to Alzheimer's and neurodegenerative disease like Parkinson's.

But the issue with long Covid and Covid in general, my concern for these people who've lost their smell, I mean, you know that this is a marker early on of neurodegenerative in certain cases.

It doesn't mean that everybody loses their smell. But my concern, 20 years from now, they knew it. The flu epidemic in the early the early 20th century.

Parkinson's increased after these because you get micro glial activation. So LDN is perfect for it. Yeah, it's it's something I've used, you know, pretty much regularly in my practice.

And and regarding curcumin, you know, I use a lot of the NRF two pathway I think there's one. Yeah. So you know,

sulforaphane, curcumin, green tea extract, resveratrol.

And I mean those are the four I'm pretty much wrecked. In fact, during the Daptone protocol I give people any C alpha lipoic acid glute to block NF kappa B I give them those to stimulate Nrf2 we use LDN.

Yeah, maybe a touch of melatonin at bedtime for an LRP three inflammasome. So I agree with you. I am working as I'm trying to figure out where all the inflammation is coming from.

This is a great point. I also working the pathways because you've got to lower down the inflammation is ultimately what's driving the symptoms of fatigue and brain fog and pain.

Right. And and dealing with that immune modulation too, said the low dose naltrexone is going to help if there's an autoimmune tendency like has someone had a positive and that maybe comes and goes.

It's that sort of vague, not really an autoimmune issue, but something there. With art, we find they would have a double switching. I really like by image in alpha one.

So some of the peptides can be really helpful for that as well. Transfer factors could be good. They can be tricky. As far as when you introduce those.

But those can be really helpful as well for some of that bigger picture. Like how do we shift them out of that to dominance. Right. Do you do you prefer I mean I tend I use the Immunol six.

The three six beta glucan from Xamarin is the most one I use probably most frequently for natural killer cells. But yeah, you do. You have a preference of when you might use beta glucan versus the transfer factors.

You use both when you when you're looking for immune support. Yeah. So it kind of I'm stumping I'm I'm stumping the biochemical expert here. Oh no I'm no biochemical expert.

It's just I'm just thinking through like okay when when does one shine? I like the beta glucan when there are more obvious gut issues going on. So if someone actually knows they they feel like they are really reactive foods or they get really tired after meals are those things.

I've seen that being a shining star there where the transfer factors like I love like a transfer factor like or that the L plus if we're starting to if we're on the back end, it's like we've done our killing and now we're trying to calm that down.

Or the plasma kick has actually been fantastic for someone who wasn't sick. And then they got Covid and they're now dealing with long Covid. The plasma kick can be helpful in low doses, just starts.

This kind of shifts down some of that reactivation, but I tiptoe into the transfer factors. I don't have to tiptoe into the the beta glucan I see and the plasma.

Like you're talking research nutritional. I'm talking research nutritionals. Yes. Yeah, they make a great line of those products. I think Debbie Hamilton has worked and did a great job of kind of getting those products out for people.

Yeah. So no, I agree with you. And you know, regarding again, the gut just going back a little bit to these you because you were talking about beta glucan in the gut because we do find so much leaky gut.

We use a lot of the bovine immunoglobulins, like, you know, the mega egg with mega Spore. We use this for base probiotics, including the probiotics free 50 billion feral Saccharomyces already.

Right. Author biotic I we use all of them. And I haven't seen a case of C diff I mean in ages, but my own leaky gut. Boy it is so much better. After taking these bovine immunoglobulins.

I could not eat any dark chocolate or histamine foods for a while. So I mean, I hate to admit it, but growing up in Bayside, Queens, pizza was my favorite thing to eat.

I still, as an adult will treat myself to it, but I would have asthma attacks and have mucus all day long with congestion. I didn't know why you'd think as a doctor, someone in medical school would have like pointed out.

And this is Belgium, by the way, this is a seven year medical program with two years of functional biochemistry. They just didn't give us, you know, this is a natural path because you get it.

Immune Modulation, Adrenals, and Hormones

But I had to learn all these biochemical pathways and all these functional meta things, because once you get out in the real world, regular medicine is great.

It works well in certain areas, but for these chronically ill patients, right. It doesn't work the same way. Right? They don't have answers. They just giving you drugs to throw, you know, throw at these disease states for the symptoms.

But they're not allowing the illness into the component parts, which is what you and I are doing. Right. You have to step back and look at, okay, what's what's the big picture, what's going on, what is driving this.

And I think even as a patient, a lot of times someone intuitively knows if they really step back and go, okay, what am I doing in my life that I could be doing differently?

What am I doing that's not serving myself? They're going to know, okay, I'm eating too much sugar because they're going to notice those patterns like so.

It's sometimes it's just a little self-reflection. Yeah. And you know, regarding that, I mean, although we tell our patients, get on a paleo Mediterranean autoimmune diet, get off wheat, dairy, gluten, sugar.

Right. You say it to people. And I know a lot of people do do it. But I can tell you from my own experience and maybe you have the same name, sugar. Forget it.

My body will not tolerate any simple carbohydrates in general. It doesn't want it. It'll do some complex carbs. But I need a ratio of good protein of healthy fats.

And, you know, complex carbs are my blood sugars are swinging all day long. And I'm. And I'm on my treadmill exercising 20 minutes, seven days a week at an incline for cardio.

So, I mean, I need a certain amount of energy from carbs, but simple carbs just isn't working. And I think people in the Lyme community, they sometimes don't realize that diet that exists, like the simple things of diet, exercise, sleep, the three big ones.

If you're not getting it right, boy, that's really impacted that inflammatory response that you just can't get better, right? Absolutely. Yeah. So, let's talk for a second about mental health.

I'm I see a lot of patients, I call them affectionately the walking wounded. I had my own abusive history when I was young. So did my wife. I mean, most people, I ask, something has happened then.

The mental health is definitely affecting, you know, with the mind body of how their immune system is affecting. Are you seeing this and what what are you doing these days?

I mean, I like neurofeedback techniques like any Hopper and Gupta, but do you have any other tricks, like when you're seeing these type of patients, what you recommend for them.

So part of it is becoming aware, you know, if someone comes into the office and either they're calling themselves The Limey. So they're identifying with the illness too much, or they are playing victim to their symptoms and not seeing a way past it.

It has to be addressed, right? Because if you don't see yourself getting better or see that there's some hope for you getting better, you're not. We could give you a magic pill and you're just not going to you're not ready for it.

So part of it is just some of that self-talk I really like rapid eye therapy. Annie Hopper's work is fantastic, but it's a huge time commitment, right?

And so a lot of times I have only a handful of patients that are ready to do that and ready to dive in. It is very effective when you're ready to do it.

But something like rapid eye therapy is very simple. It's, you know, following some eye movements and having someone give you a script. I have names that I work.

You're talking eMDR through like a similar to eMDR. Yeah. So you look up eMDR, it's a very similar technique. But you're people doing it like there's a way to do it on their own with this without necessarily.

But they work with it like I have someone that I work with who does it via zoom, and she's really effective that way and really inexpensive. And so that can be really helpful.

Therapy can sometimes be helpful, but usually there's like a physical connection. Neural therapy can sometimes help okay. Release some of these things get trapped in scar tissue.

Oh my gosh. There's there's so many things. Sometimes body work can be really helpful too. Like some cranio sacral exercises connecting through your church or with God or your spirituality, whatever that is.

Because part of it is, how do we lead in a strength that's that's bigger than us, right? And so regardless of your beliefs, like for me, my, my most nourishing thing is going out in nature and being away from the noise and just feeling the power of that.

So, you know, I think that's a really important piece too. Yeah. No, it's a great point. And I, of course, discuss this with all of the patients who come in because I think it's it's a point that they don't realize like how much this affects them.

And, you know, regarding chronic fatigue, even for myself, my wife would tell you she's, she's a master astrologer. And I'm an Aquarius with an Aquarius rising without going into too much of a detail.

But I'm a 12th house her, so I don't always see myself properly. And she is a 12th house. Or I need a sacred mirror because sometimes if I'm feeling tired, it's not because I'm not eating right or exercising.

It's like it's my mood and I'm sometimes feeling fatigue and realizing it's my mood. Actually, that's affecting my energy level. It's not that I'm not getting enough sleep or exercising, and I don't even myself, even sometimes make the connection.

I need my sacred mirror to sometimes say to me, hey, honey, you know, you, you just had this event and I think it's affecting you. But I think the other thing to also notice is sometimes it's not just, you know, our thoughts, sometimes our thoughts are coming from these imbalances in our body.

So imbalance is the thing. The thing the beauty of working with kids is they have no filter. Right. So when I see is like when different cluster species go up, it drives dopamine.

They turn into little jerks. So all of a sudden if if someone like with kids, they start biting their hand and biting their shirt and hitting the dog and hitting their siblings.

That's probably a bacterial overgrowth. And it's really interesting to see you treat that. And what I see in adults is that presents as anxiety. And so a lot of times I'll look at some of those neurotransmitters or think, okay, maybe this is dopamine or oleynik acid or something that's out of balance, that's doing that.

And maybe we need to look at gut health and diet and some of those things too. Yeah. No that's perfect. So we're getting actually close to the our talk.

I mean, are there any other specific points, things that we haven't covered that you think like would be important for people to know from the naturopathic perspective of what to do for chronic fatigue?

You know, how to address some of these resistance symptoms. Any other like important words you think you could share? So I think, the hormone front, we haven't really talked about that.

So adrenals adrenals adrenals adrenals. Right. So if you are just wiped, you wake up and you're wiped out. You probably have low adrenal function, especially if you've been ill for any amount of time like that has just it's drawn on that and a lot of times that could look like just fatigue during the day and sometimes a weird spike at night that you just are wound up and busy, busy brain at night.

I use a lot of adrenal glandular. So adrenal cortex I find, is an incredibly important and probably one of the main things I would give to a new patient who's dealing with fatigue. It's food for the adrenals, right.

So it helps to nourish that and gives you a bit of an anchor to draw from. And some of the adaptogens can be really good. Integrative therapeutics makes HPA adapt that I like quite a bit.

I use a lot of just ashwagandha or Eleuthera corpus, which is also called Siberian ginseng. That helps give a boost. But addressing adrenal function, there's fancy lab testing and things you can do for that.

There's like an aside that adrenal saliva test that you can do to give the patterns over the course of the day if you want to. Or you can just do a cortisol level and a DHEA in labs, or you can just treat the adrenals and see if they feel better.

Now, I agree. In fact, I run a DHEA on every patient when they first come in, and it's very rare that someone doesn't have at least phase one adrenal dysfunction going up to phase three.

And I agree with you, I use the glandular a lot. And for me, I either go to the ortho molecular adapt to all, or I go to the same again. Adrenal lessons for the Adaptogenic I find sometimes that you're right.

I mean at night, sometimes you need fast a little Siri. You need something to take down the overstimulated adrenal. So yeah. No, I think we're seeing the same things, which is the hormone disruption is happening.

And a lot of these people, and you talked about teaching cortisol. We didn't. I think we could finish off a little bit with Pregnant Alone. I'll even see pregnant alone steals right in some of these people where they're using it to make adrenals.

The sex hormones are dropping off. And I don't know that the dose is, pregnant, alone, even in men. But, you know, for women, I'm maybe using 100mg twice a day.

And in men, I'm usually sometimes using 30 to 100mg a day. A pregnant woman, a pregnant woman that, you know, that's interesting because I usually have kept it on the lower side to 20 to 30 milligram.

I take like 30 a day just to support my hormones with some DHEA. I didn't, so you're not worried? You just have to follow the hormone pathways to make sure what goes into adrenal, what goes into sex.

Because some women, for example, their testosterone might go up if they have PCOS or insulin resistance. Right? You just have to follow it. You just have to follow it and see.

And usually I go based on symptoms, but, higher doses of pregnant alone, in men sometimes can be used for anxiety and some of these other mood disorders.

So yeah, I was I was like you, I, we used really low doses. And one of the other doctors in my practice told me about these higher doses. And I found sometimes that was working quite a bit better.

The other thing is I'm seeing a lot of low testosterone in our in our men. A lot of my 20 year old men have testosterone levels lower than my 60 and 70 year old men, and that's the inflammation affecting the HPA axis, right?

So, you know, years ago, I don't use regular testosterone or even bad HCG shots I've gotten. Do you use Clomid and rim and exclamation and anastrozole because I found 25mg a half of a column, often three times a week, with one milligram of arithmetics to stop the romanization.

You're right. I'm seeing the same men's testosterone. You're doubling and tripling without giving them replacement. Because if they want to have families, I don't want to suppress it by giving them exogenous testosterone.

Yeah, I've seen some really nice things with Anastrozole. And I've gotten a lot of, like, dirty looks from pharmacists about that. But just a half a tab, you know, twice a week has I've seen it bring testosterone levels and some men up by 400 points.

It's been amazing. Yeah, yeah, I do use testosterone if we're not, you know, worried about fertility issues. I think that that's really helpful. And I use testosterone in women as well, man.

It helps with that ability to multitask and mental clarity and libido and drive and all of those things. Right. No no, no it's excellent point. So we're we're actually about at the one hour mark.

So I just wanted to thank you so much. This by the way this was this was this was great to have these conversations back and forth talking about, you know, nutrition and biochemistry and helping people with chronic fatigue.

I think people are going to find it extremely helpful. So tell them again one more time, how can people get in touch with you? Because I'm sure they can want to get in touch with you after this talk. Yep.

So Amy Jackson at Holistic Healing arts.org I'm in Seattle, Washington area. And you can just find me there. Okay. Well thank you again Amy. This this was great.

So I want to thank everyone again for joining me. My name again is Doctor Richard Horowitz. I'm co-host of the healing from Lyme Summit. We've been with Doctor Amy Dirks and talking about solutions for chronic fatigue and looking at the these really interesting biochemical pathways and in chronic fatigue.

So Amy, thank you so much. And I look forward to speaking everyone soon at another episode of the Healing Lyme Summit. So thank you for joining us today.