



EVERYDAY IMMUNE RESILIENCE

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Okay. Hi, everyone. Thank you for joining me today. Today, I'm going to be talking about mental resilience. One of the things that I think all of us are having a hard time with is just dealing with the pandemic — the social distancing environment really has some major impacts on what's happening with our overall health and potentially our immune function.

I know a lot of the people that have been readers of my book and following the articles we write and everything or suffer from autoimmune disease and chronic inflammatory disorders and many chronic conditions. There's some significant impacts of this concept of social distancing, that can have a profound impact on the immune system, and there's some things you really should know about to try to mitigate those types of responses.

First of all, the psychoneuroimmune response is very, very real. We tend to ignore that. There tends to be a lot of focus with everyone that has chronic disease or chronic inflammation — thank you everyone that's joining — with just taking supplements or changing diets. And I can tell you one of the most powerful things is this psychoneuroimmune response.

I know that in my private practice, when I see a patient with a chronic severe autoimmune disease, if they're coming in and they have support from their spouse or their loved ones, they usually do a lot better versus when they come in and no one in their family believes that they're sick and they're dealing with issues. We know that it's really important to know that our mental health has a significant impact in our immune system and has a significant impact on our inflammatory response and so forth.

We're kind of all at this state dealing with the social distancing that we're having decrease human contact with other people, and that we're more at risk for having inflammatory immune response. Let me just share with you some of the major mechanisms and pathways that take place.

The psychoneuroimmune response takes place when there's a stress response but it can also take place when there's lack of activity in the brain. There's a concept that's called neurogenic inflammation. Neurogenic inflammation is a concept where your psychological and cognitive thoughts and the firing rate of your brain has an impact on inflammation. What they find is that when there's lack of activation, lack of integration in different centers of the brain, there's an inability to dampen the sympathetic pathways that really can trigger inflammation on their own. We tend to think that inflammation only be triggered by the immune response but it's really something where our emotional and cognitive functions and our brain functions can actually really promote our inflammatory immune response as well. It's really fascinating, this world of psychoneuroimmunology and neurogenic inflammation.

One of the key things also is that if you don't have enough activation of your brain, if your brain's not stimulated, then you can significantly promote depression, inflammation, and different types of inflammatory reactions. When you're looking at this pattern of being in social isolation like the stress response, there's a few things that research has really shown to make a really big impact on how you function. One of them is being positive.

One of the things you should understand is there's a concept called plasticity. Plasticity is the concept of when you do something over and over again, you get more and more efficient with it. For example, if you were trying to hit a golf ball. And then you started to hit the golf ball, and you started to get cleaner and smoother with your activity, then there will be a period of time where you can hit the golf ball and you're pretty accurate at doing it, and you may not even play golf for a year and come back and hit the golf ball and you're fine.

Now, on the other side, if you have bad habits and you hit the golf ball wrong or tennis ball or whatever sport is your favorite, and you keep repeating that strategy, that's how you'll actually remember to hit the ball. It's much harder to get through.

So there are people that actually have a negative plasticity with their mental thoughts. I think we've all met them. It's really important to really just maintain a positive outlook on things and to try to really practice positivity. If you do it over and over again, then you actually develop positive plasticity pathways in your limbic system.

When we look at our limbic system, in our cognitive thoughts and our neuropsychology, it's really no different than our motor system when we learn synchronized movements and do activities. If we repeat the same positive behavior over and over again, that has a big significance. In the world of psychoneuroimmunology, there is something that is continuing to show through significant positive impacts and that's gratitude.

A lot of practitioners I know work with patients that are really sick. They always say, "Try to write down a few things. Maybe five things that you can think about that you're happy about. Just the daily routine." They can do that with some deep breathing. That can make a big difference for them. Having gratitude, having positive plasticity really makes a significant difference in relation to our mental resilience. We can get all types of neuroinflammatory responses that are taking place. We forget that. Every person's unique. At some point, you've got to figure out some of these things on your own.

We also know that facial interaction is really, really important. Your brain lights up completely differently when you see a person's face than when you hear a voice. It's really, really is important to try to use things like FaceTime and Skype or whatever teleconferencing app you have. Seeing people's faces has significant change in the areas of the brain called the fusiform gyri where you can actually perceive a person. That also has very powerful impacts in the areas of the brain called the limbic system which are part of the area that controls this neurogenic inflammatory response.

You may actually have to put an effort to really try to interact with people. It's a good time to call old friends. It's a good time to connect with people you haven't talked to in a long time. I remember my wife and I, we were just thinking about our old friend of ours, and we just FaceTimed that person right there and then. We had such a great time. It really changed our mood for at least a few days.

It is important to think about putting some effort into those things. I was talking to my daughter the other night. "You really should connect with some of your friends." She says, "They're all busy." I'm like, "What are they busy doing? Just FaceTime them."

It's important to make some efforts to have some facial interaction. Communication that way, connect with some old friends. Have some positive gratitude. Think about positivity. Those are good things. Human contact is important, so giving a hug to your family members or people you're with makes a big difference in your overall sense of well-being. These are important.

I can tell you as a person who's been practicing functional medicine and working with significantly chronic patients for a very long time, the psychoneuroimmune part is the game changer when it comes to patients really making a difference for if they feel better or not. Those are just some general principles.

I'm happy to take any questions if people have questions. My wife is helping me today because apparently, I can't read [laughs] — I can't read the questions fast enough and I don't know how to scroll and I do need help. This is a definite weak area for me. So she's going to help.

Let's see some of the questions that are coming up here. We don't have any yet? Just some comments. Thank you, everyone for joining and saying hi. I really appreciate it.

Sometimes, you do these Lives and go, "No one's going to show up. Why do I do them?" Just to see people on is such a positive thing. Thank you for doing that. It helps my mental resilience to see people on this podcast.

Daniel puts in "**Meditation, deep breathing, coherence,**" yeah. These are significant things. I can tell you for myself, the game changer for me was to learn how to do transcendental meditation. I do transcendental meditation. I try to do it twice a day for 20 minutes, and it profoundly impacts my performance, my brain function, my mood. It's one of these things that really has been a game changer for me. It's easy to forget to do some things like deep breathing or meditation or gratitude, but when you get in the habit of doing it, it really is important.

Beverly says hi to Mrs. Kharrazian.

She [his wife] said she would do this [be on camera] but she just got done working out.

Jan Paz says, "**Your take on psychoneuroimmune.**"

My take on psychoneuroimmune. I don't understand what that means. It's very real. Actually, the most fascinating thing in the literature, in the psychoneuroimmunology literature where

they're actually showing how your thought process really impacts your health and your immune function and so forth.

Okay. Susan. **Can you please talk about the cytokine model of depression versus the “you don't have enough neurotransmitter” model.**

Yeah. Thank you for asking that, Susan. That's a really good topic. One of the things that we do know is that in the past depression has really been focused on — the neurotransmitter issue and neurotransmitter deficiency. For a long time, drugs were being developed for these neurotransmitter pathways where it's serotonin reuptake inhibitor or dopamine antagonist or dopamine reuptake inhibitor or combination of different medications or MAO inhibitor. All these things do is they try to increase the neurotransmitters of the brain.

With more research now, we're really finding first of all, the outcomes of those studies can be questionable because of the degree of negative versus positive clinical trials, and there's some imbalances with that. Dr. Kelly Brogan does a great job explaining some of that stuff and she has a great book if you're interested in that perspective of antidepressants and the flaws in research and so forth. You definitely want to check out her information.

In the literature right now, the finding is that the cytokine model of inflammation is really one of the main models of depression. That's where inflammation causes depression. Interestingly enough, in animal studies when they're trying to create a depression model, what they do with animals is they socially isolate them. They decrease their movement. They take an animal, it's basically a solitary confinement. In animal research models, that's how you actually establish a study group that is depressed when they're studying animals. They put them in isolation, they don't have them move, the brain doesn't get activation and stimulation. They get depressed.

For the most part, when you actually look at the neurophysiology of depression, it's pretty straightforward what happens in this state of depression. Basically, the prefrontal cortex, the very tip of the brain, the prefrontal area just stops firing. That can be caused by inflammation. That can be caused by neurotransmitter issues. It could also be just caused by just not using your prefrontal cortex. Finding your purpose, find the things that you want to do. Trying to create tasks, trying to take on projects, those all make a huge impact on your mental health, mental resilience and your immune function.

Sometimes, the best way to really change to immune system is to find your purpose. My purpose today is going to be cleaning my office a little bit. That's going to have an impact on my sense of self. I'm hoping that when I get done, I'll have a better sense of self and better immune function and so forth. You really have to find tasks and things to do to really activate your prefrontal area. As your prefrontal area's activated, you change your neurochemistry. You change your mood.

Exercise is also the way to do it. The point is that in exercising, you still have a purpose. “I'm going to try to get 10 reps in. I'm going to try to finish the workout.” Having tasks to do are

really important. Those are things to really think about when you look at the models of depression.

Ultimately, depression is caused by decreased frequency of firing of the prefrontal areas. That can be caused by neurotransmitter balances that could cause inflammation, that could be caused by just lack of activity. Lack of activity is actually the most common cause.

If you look at the peer-reviewed literature and look at the most effective ways to actually support depression, it's actually exercise. Exercise is really nothing more than just having the purpose of trying to do something at the very basic level and then more physiological level. You're changing heart rate. You're changing your chemicals and all those things when you move your body. A big part of it is just having that sense of focus.

Okay. Bill. **Could you comment on increased cortisol and increased TH2 response?**

Sure. Increased cortisol, increased TH2 response. You got to be careful looking at cortisol responses and hormone responses when they're looking at TH1 and TH2 responses because it's dynamic and it's not so linear. Hormones aren't the only factor to raise the immune pathway like TH1, TH2. These pathways have multi-variant pathways for different types of reactions integrated together that can have some immune response. Cortisol levels when they go up, they can have different effects. When cortisol is going up, there's a difference between immune function and immune responses where there's acute or chronic.

Acute cortisol elevation is one of the things that will happen in the first few minutes. As you increase catecholamines, you increase heart rate, and as it goes into the first few hours, cortisol elevation will start to have an impact on dampening NK cells and T cells and has this suppressive impact, and then as it gets chronic, you can have these shifts in [TH] 1 and 2. So if you see a shift between TH1 or TH2 in some kind of study, then it's kind of the timing of when that study was done and what phase of it. It goes all over, so I don't think it's specific just to a TH2 response.

Okay. Vinny. **Can you talk more about the impacts of gratitude on the brain?**

Gratitude in the brain. Yes. When you look at different thoughts, there's an area of the brain called the limbic region, and the limbic areas of the brain are where you process emotions but the limbic areas of the brain are directly connected — if you ever look at them, slices of the brain, you have an area of the brain that's called the hypothalamus that controls all your endocrine functions. Just right around that hypothalamus area that's connected right into the very centers of our brains is our limbic regions. Our limbic regions activate and create different types of responses [...] where we are.

So if we have a survival response where it's a fight or flight response, those areas of the limbic system fire to the hypothalamic areas where we create sympathetics. Gratitude seems to have a very different effect. Gratitude seems to have an effect where we activate our opioid responses. And as we activate our opioid responses in our brain, we — the fact that you sit

down and have gratitude and have that sense of your appreciation, that is a opioid neurophysiological response. If you can sit down and have gratitude and just think about what things are great, usually you'll smile. You're smiling and feeling that way.

That is not a motor response. That's a neurochemical response. Your brain is really flooded with opioids. When your brain gets flooded with opioids, the hypothalamic activation, those opioids are being released systemically. Those opioids are actually turning on and activating your T reg cells and your T cells. It has a major impact on your immune system. What's funny, too is when you see patients that are really, really sick, there are some patients that really do well. Despite their difficulties, the fact that they have always a positive attitude completely changes their immune system and how they function.

You can have people develop a chronic autoimmune disease. Let's say MS. One is still really, really positive and looks at the great things. One is just miserable and only focus on the negative. Their progression is almost predictable how they'll recover or not with the diet and lifestyle protocol. I hope I answered your question there. Okay.

Okay. From Judy. **Are there any tests to determine if you have TH1 or TH2 dominance?**

Yeah. There are tests that do this. Conventionally with LabCorp or other labs, what you can do is just measure cytokines that are associated with TH1, TH2, but they're not the most sensitive markers. The best thing to really do is what's called the cytokine stimulated tests. What you do in the lab with these, you get a person's blood, you isolate cells from their sample, you stimulate in what are called [...] . That will cause these cells to release cytokines and then you can measure those cytokines, and then you can see what kind of state these cells are in.

When we're looking at things like TH1, TH2 function, you can look at the levels in blood for those cytokines. There's messenger proteins associated with those immune responses, but they are only going to show up if it's very, very active and very, very severe.

What you really want to look for from an autoimmune chronic disease perspective is how our immune cells prime. Your T cells are just sitting there, and once they're developed, they can express into TH1 cell, which is there to activate inflammation and natural killer cells and T cells, or into a TH2 cell where they have a more ant-inflammatory, antibody producing effect. For immune infection response, we want both, but if you have high state of inflammation, you want to really try [...] for example those TH2 types of cells.

When you're looking at profiles, when they take a T cell and do a cytokine stimulated test, then they can actually see how the immune system is shifting cells to a TH1 pathway or to a TH2 pathway. Much, much more accurate than levels. That's called a cytokine stimulated test. We were having those measured commercially before but they're not available. I know Cyrex is working on getting those released soon, so we can have that technology back to evaluate patients. Okay.

Lisa. Do you feel that hormone imbalances is the fault or the cause of autoimmune disease?

Well, hormonal imbalances will definitely trigger and have an impact on autoimmune diseases. We know that as estrogen spikes in perimenopause, that triggers the autoimmune response. We know that menstrual cycle fluctuations in a female that still has their cycles can really trigger a dysfunction in the immune system. So hormone fluctuations and surges tend to have some effect on the immune system. There tends to be more of an activating stimulating effect of when it's spiking and out of normal sequence.

Now, which comes first? Well, I think when the immune system can actually attack the endocrine system. The most common autoimmune disease in the world is Hashimoto's where the immune system attacks the thyroid gland, so you get thyroid disorders secondary to an immune response. But also, for example in thyroid disease, thyroid hormones have been shown to modulate the immune system. With thyroid patients, there's always what we call the honeymoon phase where they first find out they are hypothyroid, they go on thyroid replacement and they feel a lot better. In the initial stages of thyroid replacements, thyroid hormones have been shown to massively dampen inflammation in the body and modulate the immune system. That effect doesn't seem to last for a long period of time. It does last for people for the first few weeks. Maybe for people a couple of months later, but then eventually, they go back to their regular inflammatory state. There's a bidirectional relationship. There's also a lot of people that have antibodies their ovarian tissue, they don't know that. That's a common cause of infertility.

There are a lot of people that have chronically low blood pressure and chronically low blood sugar symptoms, and they can't fix that, and they actually have adrenal antibodies that are subtle, and they haven't progressed to what's called Addison's disease.

There's a relationship between hormones on the immune response and autoimmune flare ups but also the endocrine system is a major target area for autoimmunity I think more so than people realize.

I can't tell you how shocked I was when I started to run ovarian antibodies in females and see how common that was and how strong this link to patients with infertility.

Also, just patients that have chronic low blood pressure and they've had it since they were 16. They just can't get their blood pressure up. They're always struggling to maintain their blood sugar stability. You actually test them and they have these antibodies to their adrenal gland system. I think it's both ways.

Doris. When are you going to come out with the new book?

Doris, we're working on a new book right now. Elaine Marshall is helping me. She helps edit my material and takes some of the stuff that I've taught about on seminars. We get the transcriptions and we start converting that into a book, so it's much more readable than a formal lecture.

We're working right now on a book on intestinal permeability. We don't actually have a title name for it at this point. The reason I want to write a book on intestinal permeability is because it has really become simplified for something that is not simple. Right now, if you look any more on the internet or [...] intestinal permeability, it's just like, "Avoid every single food intake, glutamine and magic should happen," and that is not real. In this book, we cover almost 25, 30 different mechanisms for intestinal permeability and reference everything with the research. We talk about clinical approaches intestinal permeability and the whole model of just taking glutamine and restricting a few foods to fix it is really a very limited model.

There's also different types of intestinal permeability; paracellular, transcellular, those types that can happen — what's called endotoxemia where they get bacteria that gets into the circulation and causes reactions. So not all leaky gut's the same and there's lots of mechanisms for leaky guts. I'm hopefully trying to write a book to really summarize the literature and research. There's so many out there but has been simplified to a very inefficient model in the world of functional medicine and nutrition. That's the next book.

Okay. Milana. **Can we replace probiotics with a raw, homemade kefir and reach the same effect for nourishing on microbiota during the healing of our Hashimoto's?**

Milana, the question is, can you use kefir you make at home to support your system for probiotics and heal? Of course. You can do that. Let me explain something about probiotics and kefir and then the things you use for your gut. One of the things that is really coming out with the Human Microbiome Project is that different people respond to different types of probiotics to have an effect. We know that there's a beneficial probiotics like acidophilus and so forth that we want to have in healthier populations, and lots of research shows that they're beneficial.

But what they're finding is that just taking a probiotic may not work based on your microbiome versus someone else's. Or you can have a different effect with the probiotic at a certain time in your lifespan with the same probiotic versus a different time. Your baseline microbiome status will actually determine which types of probiotics you seem to react to. Kefir is definitely fantastic if you can have it, if you can use to to help support your gut, that will have a lot of overall general benefits. It's great that you're doing that.

Just know the concept of probiotics, research is really showing us that there's difference in impact based on your preexisting microbiome and how it feeds it. For me, one of the things that I put together was a 3D plant protocol [3D Immune Tolerance program online at drknews.com] where I teach people how to do a veggie mashup. Lots of different plant fiber. One of the key things is diversity of the gut seems to be the big issue. Diversity of the gut is really determined by lots of different plant fibers. If you can really diversify your gut and get lots of different plant fibers there, then that can really change your microbiome. The more diverse bacteria you have in your gut, the more efficient that would be. I hope that answers your question.

Zima. **What is your opinion of bovine immunoglobulin, IgG supplements for food sensitivities, non-dairy permeability.**

My opinion on them? I think I've seen them for most people who have varied effects. For most people, I don't see much effect, they tend to be quite expensive. We're always open for patients wanting to try to try for themselves what's going to work for them. I haven't seen it as an immediate go-to in my clinical practice for making much of a difference for them. There's so many other nutrients that can be more effective in managing their immune system, their immune tolerance than that. It's not the first thing I go to. For some people, they do notice some benefits with it. The problem is we don't know which people react to it and respond to it. For me, it's lower on the clinical usage scale.

Okay. Rebecca says, "**Please will you add a chapter in your new book on the blood-brain barrier permeability.**"

Yes. The blood-brain barrier is overlooked. Blood-brain barrier permeability is a really, really common phenomenon. We're learning more and more about the blood-brain barrier. We just published a paper in the Journal of Molecular Science, Dr. Vojdani, myself and Dr. Martha Herbert where we showed that intestinal inflammation and leaky gut actually causes blood-brain barrier permeability.

That was one of the first page of papers that really showed that. We took patients that had inflammatory bowel disease confirmed by [...] and then we measured blood-brain barrier proteins in S-100B, and we were able to show that there was a significant risk of having intestinal permeability for having blood-brain barrier permeability. We're able to calculate odds ratios that also showed very high degree of correlation between those two. The interesting thing is that if you have intestinal permeability, it's pretty likely they have blood-brain barrier permeability as well. We'll definitely add a chapter on that in the new book. Thank you for bringing that up.

Okay. Jana. **What is testing called to check for adrenal antibodies?**

Jana, the testing for adrenal antibodies is called 21-hydroxylase. Any conventional lab can do them. There's different target proteins for the adrenal glands but the one that most commonly shows up is 21-hydroxylase. 21-hydroxylase is the enzyme that helps produce adrenal hormones. Just like with Hashimoto's the main target enzyme protein antibody is called TPO, with the adrenal glands, it's actually not TPO but it's 21-hydroxylase. If you can have your doctor order 21-hydroxylase, then you'd be able to screen for adrenal autoimmunity. There are also other target proteins that are not as common but that's the one to get the most results from.

Okay. Susan. **Vitamin D. I've heard it's important for stable mood. How important is direct sun versus diet versus supplementation for adequate levels?**

Great question. The question was about vitamin D and its effect on mood. The interesting thing is that when they look at areas where there's not enough sunlight, they see vitamin D levels low, and they also see that there's different degrees of depression. And they make this association between vitamin D level status and mood and so forth. Typically, in a real clinical study, when we see people take vitamin D, you don't see their depression go away. It may just be an association but it's not really the only mechanism.

Actually, sunlight has a different effect than just impacting vitamin D. Sunlight actually fires light into your system — especially full spectrum light — when it comes to your system, it's your retina. You have this activation of your projections of the slight spectrum of light to your optic chiasma. You have these suprapretectal nuclei that fire into your limbic system, and they activate your levels of serotonin and melatonin and so forth. Actually, full spectrum light — and people sometimes use full spectrum light therapy for changing their mood.

I think when people associate vitamin D regions like Alaska or Washington or different countries where they don't have enough sunlight as a link to depression, that's an association, it's not causation, but it seems like the meaning is actually getting that full spectrum sunlight to actually activate those pineal and pituitary pathways that then turn on serotonin and dopamine activity that can really change your mood. I don't think you can just take vitamin D and change your mood. I think you're actually going to have to get full spectrum to change it because I don't think the mechanism is just the D. I think it's actually the light activation of these neurotransmitter pathways.

Okay. Cathy says, **"I have Hashimoto's and would like to take your upcoming class but I am not a medical professional or student. I'm wondering if it will be beneficial."**

Cathy asks the upcoming Hashimoto's class we have at the Kharrazian Institute. She's not a practitioner. She wanted to know if she should take it. Let me try to answer that. The class that we're teaching at the Kharrazian Institute on Hashimoto's, it's a two-day course. It's going to be streamed and it will be [available after for] On Demand. It will be streamed on the day of the event and then after the event, you can get them on demand. It's really designed to go over all the research and all the pathophysiology. If you're not a healthcare professional, it may not be for you.

On the other hand, what I've learned working with my patients, my patients are smart. My patients are extremely up to date on literature. Sometimes, they come in and they're almost scary — “You should be in practice.” If you're interested in seeing the actual data and research and the actual mechanisms, then I would definitely encourage you. If you haven't had a lot of background in physiology, some of the terminology, maybe some things you'll have to look up and it might be not worth your while if it's a struggle with physiology terms. It's not a course that's simplified with “this is what you do.” It's really for the patient — it's really designed to show all the current and up to date research on Hashimoto's and the pathophysiology of these

mechanisms. I'm actually very excited that it's coming up. For me, getting to share all this new information — the book I wrote on Hashimoto's was in 2009. It's almost 20 years since. We've learned so much about Hashimoto's since then. I'm really excited to be able to update people some of the new things. Eventually hopefully, we can convert a lot of that information to a book as well.

Okay. Doris. **Can you explain adrenal fatigue?**

Can I explain adrenal fatigue? Okay. Yes. Adrenal fatigue. Adrenal fatigue is a term that's used in functional medicine and alternative medicine nutrition. It's not really a disease process. There's a lot of all these arguments. How do you define what it is? For the most part, you're going to get different answers. We don't have a clear definition what adrenal fatigue is. Technically, adrenal fatigue would be defined by most people as you do a cortisol profile to measure cortisol levels throughout the day.

There's a circadian rhythm. You're trying to see if your cortisol output matches most people's cortisol output in the population. That's where the reference range comes from. The reference range is established usually by laboratories that are CLIA certified. CLIA certified means they have to go through standard operating procedures to determine what the patient population range is. They have to show that someone is outside of that range. Simply put, adrenal fatigue means your cortisol levels are not as similar to the rest of the population, and that you may need to do some things to support that.

And people in functional medicine nutrition will do stimulants and provide botanicals like adaptogens or B-vitamins and nutrients, to help stabilize blood sugar levels and see if those cortisol levels go back. I think most people define adrenal fatigue as abnormal levels of cortisol compared to levels of the general population. It's not necessarily classified as a disease. It's not Addison's disease. It's not adrenal gland hypoplasia. It's just a functional expression. Just like someone can have a functional hypoglycemia or a low blood sugar state. It's not a disease. It's just a physiological response.

Okay. Julie. **Main cause for extreme head fog. Where to start?**

Main cause for extreme head fog? Start with brain inflammation. If you have a lot of brain fog, it's very likely that you have brain inflammation. In your brain, you have cells called microglial cells. Microglial cells get activated through any systemic inflammation. They really decrease the speed and the firing rate of your nerve conductance. That is what we call brain fog. I wrote a book on the brain, *Why isn't my brain working?* I've spent a lot of time explaining the mechanism and concept behind it. There's a section on brain inflammation or nerve inflammation, I can't remember but it's in the table of contents. It lists nutraceuticals that you can support.

Also, a lot of times, it's just inflammation. It's not uncommon to see someone who is food sensitive get off gluten and that's fine and their brain fog goes away. Or they have dairy intolerance or things like that. The most common dietary causes of brain fog in the population

that I've seen as a practitioner is gluten and dairy intolerance, and you've gotta remove those for a period of time. Other than that, if you have an inflammatory condition, inflammatory disease, you got to have it in control.

Maybe the third step is to look at all the flavonoids that have been published that dampen brain inflammation. The main ones are resveratrol, turmeric that have the most amount of research that dampen brain inflammation. Okay.

Okay. David. **If a person eats a perfect diet but still has hypoglycemia, what treatment can be done for them?**

Okay. This is actually how I teach practitioners how to look at blood sugar issues. One of the things that I teach practitioners, is to go, "Listen. When you evaluate a patient, see if they have a blood sugar issue." The first clue that is someone has a blood sugar issue is that there's a change in energy after they eat. Normally, there should be no change in your energy levels after you eat. The only thing that should happen after you eat is you're not hungry anymore.

Now, what makes hypoglycemics diagnosable or that didn't screen clinically is that when they eat, their function comes back. They can think again. They can focus again. They can concentrate again. That's a sign that the blood sugar is too low. If that's happening all the time, then that clinically indicates that the person's hypoglycemic. That's a low blood sugar state.

People that have a high blood sugar state like insulin resistance, they'll eat and they just get tired and crash and crave sugar. They get in that vicious cycle.

Once we identify that whether they have high insulin patterns and the insulin resistance issues in particular craving sugar or they have a low hypoglycemia pattern, then the next question is, does their diet justify it?

If I see patients with hypoglycemic patterns where they actually feel better and they can function again after they eat, then the next question is what's your diet like? After eating a diet, that's like, "I skipped breakfast. I had a gluten-free muffin with breakfast with a coffee drink that's made with whipped cream and sugar, caramel sauce on its side or something. That will take me to two and then I crash and then I have a cookie with a really healthy salad. I crash again. At four o'clock, I have to have a piece of chocolate." Yeah. You should be hypoglycemic. Because that lifestyle is causing hypoglycemia.

Someone came in with hypoglycemia symptoms and goes, "Hey, listen. I wake up in the morning. I immediately have to eat protein. I ate a lot of protein in the morning. I eat high amounts of protein and fiber every two hours, and despite doing that, I'm still hypoglycemic." The first thing is that person basically is causing hypoglycemia because of their dietary choices and how they're eating throughout the day.

Second choice, something is causing their hypoglycemia. And there's something that's making their adrenals not able to produce cortisol. And those are related to infections, those are

related to significant inflammatory responses. Those are sometimes happening after brain injuries.

But there is an underlying mechanism that's causing that that you have to identify, and you can't supplement your way out by supporting adrenal glands. For some people, they have Celiac disease, they have a very significant response to things like gluten, and they can't get off it. For other people, they don't even know it but they actually have something like hepatitis C.

You really need a thorough evaluation by a really good functional medicine practitioner to find out what's causing your adrenal glands to not work properly so you're always in a low hypoglycemia state. You also need to make sure there's no pathology there, any kind of diseases. You really need a good workup since you're eating really well.

The problem with hypoglycemics I should also say is they all think they eat really well. They actually have good food choices. They're not just eating frequently enough. You go to a hypoglycemic, "What do you eat? I have a fruit smoothie every morning. I have lots of fruit in it. I put apple juice. I make my own apple juice." What do you have for lunch? "I have some fruit salad." They're basically a fruitaholic but it's way too much sugar. They're not getting enough fiber and protein with it. A lot of times with a lot of hypoglycemics, you just say eat vegetables for a while and stop the fruit. They're like, "Wait, what about my nutrients?" All your nutrients are still in vegetables. Some of the difference between vegetables and fruits is there's no sugar.

Sometimes, I'm making a joke and say, "There's people that are hummingbirds out there. All they are doing is eating sugar all day. They're fruit and healthy but that causes them to be hypoglycemic." So make sure it's not just the fruit issue. If you have hypoglycemia symptoms, you really can't have fruit by itself. You really need high amounts of fiber in combination with it or just stay off fruit for a while. Build your system back up, your adrenal glands back up and add vegetables. I hope that answered your question.

Okay. Renee says, "**In your pre-testing for the Hashimoto's course, you mentioned the visible effect that lactobacillus reuterii has better function in animals. Can you extrapolate that to humans?**"

With any animal studies, extrapolation to human, it's never 100%. It does give us some significant impact. A lot of these animal studies, they cut the thyroid gland and see what happened to the thyroid gland. They open up the brain and see what happened to the brain cells. Sometimes, with the research designs, if there has to be animal study designs to be able to answer those questions. They can't with human studies with some of those mechanisms but we're always cautious to interpret that. Again, with any kind of probiotic, it really depends on your pre microbiotic state to see if that's a way to support or not.

In general, the key thing with Hashimoto's isn't that there's a perfect strain of probiotics. You just want to keep your microbiome diverse and healthy and eat a lot of fibrous foods and a lot of diverse fruits [and vegetables] to make a really big difference in your microbiome health.

Okay. Michael. **Is there a way to correct insulin resistance? Less simple carbs?**

Yeah. If you want to correct your insulin resistance, if you have insulin resistance and you're fatigued, you crave sugar and you're heading towards diabetes, the key thing is limit sugar and starch. See if that helps you. The best way to know how to do that is just to eat a meal and see if you get tired. If you're eating a meal and you get tired, there's still too much sugar and carbs. For some patients, when they find out that any kind of carbs or any kind of sugar makes them pass out, they have to then try a vegetable protein type of diet.

If vegetable protein diet still makes them tired, then maybe the content of their food. They go from reducing carbs, reducing sugars and then maybe just vegetable and protein. See if that helps. If vegetable protein doesn't help, then reduce the protein size. For some people, if that still doesn't help and for some people, one of the best strategies that happens is just to go on and try ketosis to really stop insulin levels. When you get into a ketogenic state, ketone levels drop sometimes by 50% throughout the day. That really calms their insulin levels throughout the day.

The insulin receptor sites can respond again and not be resistant. For some people, the only way to get out of a chronic insulin resistance issue because they just can't cut enough carbs and sugars or food is to get into ketosis. For other people, it even has to be further. They not only get into ketosis, they have to do some intermittent fasting. The goal of these things is to drop circulating insulin levels for an extended period of time, then the receptor sites can regain their sensitivity.

If you have really severe insulin resistance and limiting your sugar intake and carbs is not really changing that, then you may have to go into a ketogenic state for a period of time. Also, get into intermittent fasting. Let your systemic insulin levels drop for several weeks and months. You can reset and then figure out how much carbohydrates you can handle. You may go through different rounds of ketosis, intermittent fasting until you balance that. It might take you many months.

Okay. Debbie. **After you therapeutically address inflammatory cytokines, leaky gut and an overactive immune system, when do you address decreased hormone levels either nutritionally or synthetically? I've just watched your perimenopause webinar.**

Debbie's asking once you have that inflammation affects leaky gut and the inflammatory level and you address hormones?

When do you address decreased hormone levels either nutritionally or synthetically?

Yeah. I don't think it's that linear as an approach. Sometimes, you have to address hormone levels first. I'm sorry. This is case dependent. I don't have a good answer for you, Debbie. I don't know. It's case dependent. I have a general rule for that. Sorry.

Okay. Susan. **Can too much exercise disrupt the parts of the brain function that cause depression making it worse?**

The answer is absolutely yes. Exercise physiology journals, they call this overtraining syndrome. One of the key features of overtraining syndrome is massive depression. Exercise physiologists have really done extensive research on overtraining syndrome because what happens is that athletic performance goes down. One of the key clues that you're in an overtraining syndrome pattern is that you can't do the same workout. Your performance is going down and down and down as you're exercising. The first clinical symptom of overtraining syndrome is depression.

They've measured people when they finish the Iron Man and they do these extensive exercises. They get to overtraining syndrome for all the different levels of biomarkers. They find the most consistent biomarker is a cytokine called interleukin 6. Interleukin 6 is reflective of how quickly they can recover out of overtraining syndrome. IL-6 levels directly correlate to the severity of depression that they get. Basically, IL-6 creates this inflammatory response throughout the body including the brain and that shuts down the activation of the prefrontal cortex. There's massive depression.

You're getting to the point where you can't overtrain and absolutely develop depression. You might want to look at the overtraining syndrome information on that. Okay.

Okay. Sean says, "**When do you want to test thyroid hormones for accurate interpretation? First thing in the morning, 24 hours after the last dosing to work for T4 only due to much longer half life.** If one is taking T3, too it peaks at four hours then it's already low again the following morning. Help us understand what is best."

The question is when should you test thyroid hormones? The morning, the middle of the day? First of all, let's talk about thyroid hormones. Not all thyroid hormones are the same. Let me give an example. Free T3 and free T4 are not stable, meaning it's very hard to get an accurate level of them in the laboratory. People assume that T3, T4, free T3 or free T4 TSH all have a degree of stability. TSH is very, very stable. TSH levels if you measure, they are pretty consistent and reliable. When you test it minutes away, hours away and from lab to lab. Free T3 is all over the place.

So, if you're trying to look at your free T3 and T4 levels and T4, you can't compare them to each other just because of their stability. TSH is the most reliable test. The key thing is really just to look at your thyroid levels the same part of the day each time. The key thing with your personal thyroid evaluation is to determine how you respond to different types of treatments and how you're progressing or not progressing.

The standard approach is just to do it first thing in the morning and then compare that as your baseline. They look at studies where they look at TSH fluctuations throughout the day. TSH levels don't fluctuate much throughout the day. They're pretty reliable when you do them. The free T3, T4 are all over the place all throughout the day. Some degree of T4 and T3 are all over the place. Remember what you're measuring in the blood with T4 and T3 is dynamic.

Sometimes, it's being converted to free, sometimes, the frees get bound up by tissues right away. They get eliminated very quickly. When you're looking at how your thyroid status is and comparing it to how it's functioning, TSH is still the most reliable way to determine if your thyroid gland is functioning, the best way. Free T3, T4, they change all throughout the day. They're not stable as a biomarker in the lab to measure, so there's lots of issues that are difficult. I would suggest if you're monitoring, just do TSH in the morning each time. That would be a good way to do it. You can actually do it in part of the day. TSH is stable for most throughout the day.

Okay. Elaine. **What GI/parasite panel do you recommend when someone is hunting for A hidden source chronic inflammation?**

The GI panel that I recommend, well, I'm not going to recommend. The GI panel that I use in my own practice is one through Genova. I like that test because they do two types of technologies. They do a parasitology test, which is a standard approach where they see if they can see the parasite. But with the most common test, they do what's called a PCR testing. With a PCR test, they can see any small DNA fragments that can be from the stool that determine if there's an infection. PCR testing is getting popular today because we're hearing all about this with the Coronavirus, they're doing PCR.

PCR is a test where they look at DNA fragments, and they can measure replication. It's an indication that the infection is active. The reason I like the Genova one is that they do PCR testing for the most common pathogenic parasites in their profile. They also do their routine parasitology. I'm really attracted to their tests because they do the PCR. All lab tests have faults. Not all of them can find parasites or bugs all the time. Also, a lot of people don't actually have them. Where is the balance? The testing that's offered is for people with symptoms. It's hard to say.

Billy. **As a Hashimoto's patient, which biomarkers and how often do you recommend to be tested while trying elimination diet?**

As a Hashimoto's patient trying which markers are useful to you, to be quite honest with you, you shouldn't waste your time looking at biomarkers to see if your Hashimoto's is getting better just from a dietary change. You should really be looking at your overall inflammation, how you're feeling, your energy levels. Those are much more diagnostic for you. TSH levels are only going to show up with drastic change in your thyroid site follicular output. A dietary change may not have that big of an impact on that pathway.

Ant then when you look at things like TPO antibodies, TPO antibodies can be somewhat useful. But they also fluctuate, and many factors can drive them up besides your diet. Your diet could have a great change in your physiology, but you had a lack of sleep the day before and that triggered your immune response, so your TPO looks abnormal. So I wouldn't necessarily think the best thing to do to monitor the effects of any kind of dietary change would be looking at TSH, T4, T3 or TPO if you have Hashimoto's. Best thing is just to see how you feel, your energy levels, if you do have inflammation. Those would be much better.

Even markers for inflammation like C-reactive protein and acute phase reactants like Ferritin, they're not always that responsive and quick enough for you see these changes that you may have with diet. I would go with more how you're feeling and your symptoms versus just looking at any thyroid laboratory markers.

Okay. Michael. **Do anti-inflammatory over the counter drugs reduce brain inflammation? How about the Omegas? I understand ideal should be prevention. Thanks.**

Yeah. When you take over the counter anti-inflammatory, NSAIDs or anything else you take, they do reduce inflammation. There's some drugs that reduce inflammation. Certain antibiotics show they reduce inflammation. They're very aggressive in the brain for a period of time. It's not the intended effect but it does happen. We see that all the time with people that are diagnosed with Lyme. They have significant brain inflammation. They go on an antibiotic. Let's put it this way. Let's think about brain inflammation. They get misdiagnosed as having Lyme. They go on antibiotics to treat their Lyme.

There definitely is brain inflammation. They go, "I must have had Lyme because the antibiotic helped." Things like antibiotics, over the counters do have an impact on dampening your inflammation for sure. The natural compounds have a very powerful effect of dampening your inflammation, too. Pomegranate extract is great. Acai extract, curcumin, turmeric, they all seem to have an impact on the microbial cells.

Okay. By the way, thank you everyone for the positive comments. I see them in the screen. I wish I could respond to everyone but I can't. I do appreciate it.

Thank you for taking the time to say something positive. Thank you.

Okay. Marcia. **If all foods trigger MCAS symptoms, is it possible to benefit from a mashup approach?**

MCAS, mast cell activation syndrome.

Marcia, if all foods are causing mast cell activation syndrome, we may definitely need to work with physician to look at strategies to dampen your mast cells much more aggressively than we may do with diet and nutrition. However, the Microbiome Mashup we talked about in the 3D Immune Tolerance Program [on drknews.com] can be very helpful for you.

Some of you guys are familiar with the 3D Immune Tolerance Program. It's a program that we put together. The 3D stands for diversify, distinguish, down regulate not three-dimensional. Distinguish, down regulate and diversify. I put together a notes video package with my team, and it really goes into how to eat and how to really improve your immune system. If you're reacting to every single food, that's the whole purpose of trying to improve your oral tolerance so I would definitely have you consider it.

If you actually do have mast cell activation syndrome, the 3D Immune Tolerance Program may not be enough. Because there's some genetic uniqueness in your degree of severity of releasing

histamines from your mast cells. You may also need a conventional approach to help your symptoms if you really do have mast cell activation syndrome. Okay. Next.

Super positive comments. People are super kind. Yeah. It's not easy.

Yeah. It's not easy. Do we have a question? Surprise. Surprise. I don't know if you guys are married. The best thing in the world is when you're right and your spouse is ... What's the next question? Everyone's waiting. What's the next question? [both laughing]

Mark says, "**Can't wait for the next course.**" Thank you, Mark. That's very kind. Okay. I'm trying to find.

Jana. **Would you see an increase in Ferritin if you increase your thyroid medications?**

Absolutely not. You shouldn't actually have your thyroid medication increase your Ferritin. Ferritin is an acute phase reactant. It only goes up when you have significant inflammation, and thyroid hormones should dampen that. If that's the case that the medication is the only thing that happened during that time frame where you're Ferritin levels rose... so thyroid medications shouldn't raise your Ferritin levels.

If you're sure that it was only the medication you took that raised your Ferritin levels and also if you noticed that the medication maybe isn't making you feeling the best, you could be reacting to some of the fillers and the medication. There is a form of thyroid replacement called Tirosint. Tirosint is different than most medications because it's not a tablet. When thyroid hormones are put in a tablet, they all have fillers. Some of these fillers are things like cornstarch. Some people that have Hashimoto's are sensitive to different types of corn and cornstarch.

You may want to confirm that it really was your thyroid replacement. People react to the thyroid replacement. One of the first things they notice is when they forget to take it, they just feel better. Sometimes, they go to camping trip and forgot their replacement. They haven't taken their replacement for a few days and then they come back and they take it. They notice how much better they felt without it. That's a strong sign that you may have reactions from your fillers. If that's the case, you may want to consider something like Tirosint, which is a gel capsule.

There's also a Tirosint-Sol which is liquid without a gel. For people that are extremely sensitive to gel. Those are things I would think about. You shouldn't see your Ferritin go up.

Courtney. **Love your dynamic. Happy to see your wife.** Thanks, Courtney.

Thank you, Courtney.

Okay. Julie. **Best test and treatment for possible mercury exposure?**

Best test and treatment for possible mercury exposure? Okay. Let me explain a few things. We all have mercury exposure all the time. That's one of the most common toxic chemicals that we

get exposed to. When you look at mercury, you have to learn a few things. If you have acute mercury exposure, the best test for that is actually a serum blood mercury level. Only conventional labs like LabCorp Quest offers serum mercury levels. That is telling you you have mercury in your blood. If you have mercury in your circulating blood, then it was a recent exposure.

Now, that's different than what people do called a DMPS challenge test or they have to first take a chelating agent. They measure their urine levels before and after the chelating agent. If you do the DMPS challenge test, virtually everyone is going to have heavy metals and mercury in it. That's different than getting acute exposure. I would surely suggest if you really think you're getting exposure on a regular basis right now, then do a blood test and see if your blood and mercury levels are high. A lot of people do get high levels of mercury exposure just from chewing seafood. It is a real thing.

There's a high level of mercury contaminants in seafood. If you're eating sushi everyday and eating fish everyday, you want to check your serum mercury levels as a test. There's a third way to test for reactions to mercury, which is mercury antibody test. That's mercury bound to albumin, and they see if the person has antibodies and that's an immune response to mercury.

So, there's three main types of testing: Your serum levels, which lets you know of acute exposure; DMPS or DMSA challenge, which is a chelating substance, which means you have tissue burden in your body at some point, which we all do to some degree; and the mercury antibody test which Cyrex measures which means your immune system is reacting to mercury compounds. Hope that helps and answer your question.

Okay. This is a two-parter. Milana asks, "**Thank you very much. I have all your books and your seminars. It was super helpful for my healing journey. Turmeric and Resveratrol are definitely working. Thanks for the supplements you helped to develop.**" The follow up to that is Jonalyn says, "**How many milligrams of turmeric do you take?**"

Okay. Thank you for reading my books and sharing your story. How much milligrams of turmeric and cumin do I recommend? I recommend as much as you need. Turmeric and curcumin, the analogy is you're trying to put out a forest fire. How much water do you need? For people that are inflammatory states, they just may need more than other people. You can't really overdose on turmeric and curcumin. With things like resveratrol, you can start to have watery bowel movements if you take too much. You need to experiment with it, because these dosages aren't based on an RDA level or what is it to reach RDA levels of a dietary intake per day that you need. They're used to block inflammation. If you have a lot of inflammation, you may take a dose of some anti-inflammatory nutraceutical and maybe it helps you for the first two hours. Then the drug stops working for you. You might have to take it again. You have to figure out what the dosage is. There's definitely some experimentation that's involved with that. Okay. Last question here.

Sure. It's a two-parter again. Hold on. Michael says, "**I believe TMG reduces homocysteine. Does this then also reduce inflammation?**" The second part of that is, sorry.

The question is does TMG reduce homocysteine. TMG is trimethylglycine. Trimethylglycine they are methyl donors. They can be used to lower homocysteine. Homocysteine is an inflammatory biomarker. You can measure it in serum. It's been shown to cause significant inflammation throughout the body. It's been most known for causing blood vessel inflammation. It's mostly used for cardiovascular disease. Homocysteine also is very inflammatory and it degenerates the brain.

There's four different pathways to lower homocysteine. Trimethylglycine is one of the major four pathways. For some people, they'll try to use things like tetrahydrofolate to reduce their homocysteine. That's a common polymorphism that people have in the population but that doesn't work for them. Actually, you just need that trimethylglycine. Trimethylglycine is really providing methyl groups. Looking at homocysteine reduction into cysteine, you just sometimes need those methyl groups in the trimethylglycine is providing those. That's the mechanism how it helps reducing inflammation. Okay.

Thank you for taking the time to ... Important topic. Okay. **Can you speak a little bit more about transcendental meditation.**

Transcendental meditation is awesome. Transcendental meditation is basically, you can go to a transcendental meditation center place and they teach you how to do the meditation. For the most part, you just concentrate in focusing on a word or a sound or a statement. You let your mind focus on it. It's okay for it to deviate and you go back into it and you go out of it. It just changes your brain activity. It changes your brain activity in a way where you actually have rest.

There's been some really good studies published on the effects of transcendental meditation where there's better creativity, better performance, reduction in stress response. For the most part, your brain gets a chance to recover and rest throughout the day. It puts you in a brainwave activity that is restful to the brain. When you're constantly focused and thinking and concentrating, your mind is just all over the place, it's nice to change your brainwave activity by doing transcendental meditation so you can have recovery and rest, and a lot of time, I can tell you for myself, it allows me to have greater endurance, able to do more things. It helps calm down the stress response. There's lots of places where you can learn transcendental meditation and lots of centers. You may want to take the time and energy to have someone walk you through it and teach you how to do it properly. I think it'll be a tool that you can have for the rest of your life, and it will definitely help you be more efficient in everything that you do, and it will definitely help with your stress response. Okay.

People are, "More, how could you?" like, "I like to get more of that." People appreciate your time. They're really grateful. That's really very kind.

Thank you, everyone for being so kind. We'll try to do these on a regular basis. Thank you all for jumping in. I really appreciate your kind words and for participating. Thanks again.

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