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Hey, everyone. Today's topic is how diet and inflammation impact your whole body. Let's first all, let's talk about inflammation, and when you look at inflammation the key things are that it can express in different tissues. We'll talk about how inflammation gets triggered, what happens to our anti-inflammatory system as we age, as we get older, how different health care conditions impact our inflammation, and then how diet plays a role in this whole thing. The key concept is that inflammation is normally a process that we use to destroy pathogens or get rid of cells. So inflammation is a mechanism where we destroy a pathogen or if we have cells that are no longer working we use our immune system to destroy them so we can have space and room for new tissue cells. Now, the key thing with inflammation and one of first questions to ask is, how do you know if you're inflamed? Well, one of the things you'll know that if you're inflamed is if it's what we call systemic inflammation, where the inflammation is throughout your whole body, that pretty much every major system in your body may have some degree of symptoms.

So let's start with the brain, when you're inflamed one of the things that happens is you will notice that you will have brain fog. You can't really think clearly. You can't focus. You can't concentrate. And one of the things that happens when your body has this inflammatory cascade and inflammation's happening, is the inflammatory mediators activate cells in the brain called glial cells. And then glial cells turn on an inflammatory response in the brain, so when that happens the speed of how nerves fire slows down and that can really slow down your brain. So basically, when your whole body is inflamed at the brain level, what you'll really notice is that your brain is just much slower. And there could be days where your brain function isn't as good as other days, there's days you're not as sharp as other days, and one of the reasons that can happen is from inflammation. So we know that, that takes place as far as basically slowing down our brain.

Now, another thing that happens when we have systemic inflammation is we have an impact in our energy powerhouse, mitochondria in our cells. Each one of our cells has a factory where we make energy called ATP. And there's a process called mitochondrial oxidative phosphorylation, or uncoupling, where we produce energy. Now, these mitochondrial pathways can, as we say, uncouple when there's inflammation and they become less efficient. So another key thing that happens when the whole body is inflamed is that a person will get really, really, tired, so brain fog, and then fatigue is really common. And this can also impact specific tissues, so if it impacts muscles and mitochondrion muscles it's really common just to feel a heavy arm, a heavy leg, just feel like your muscles don't move. You may have a hard time recovering. Those are the main clinical presentations of systemic inflammation.



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Now, if there's inflammation in the gut, in the gastrointestinal tract, you can have severe bloating, and distention, and feel those types of reactions. It can have inflammation in your blood vessels, which can injure blood vessels. You may not necessarily have any symptoms, but it's part of the process. And overall, when your body is chronically inflamed, it does speed up brain degeneration, joint degeneration, promotes chronic diseases, it's just not the best thing. So if you're always tired, fatigued, your brain is slower, your muscles hurt, that could be a sign that you just have some degree of system inflammation.

Now, the other key thing about inflammation is that inflammation puts fuel in the fire wherever there are injured cells or where there's already some fire. For example, if you had torn your lumbar disk, you had a disk injury or herniation, when you get inflamed it might go right to your back. Someone else may have had a traumatic brain injury and they've injured, let's say, their frontal lobe, and when they get inflamed, they lose focus, and attention, and concentration. Someone else may have had injury to the brain in a different area, maybe their cerebellum, and they get inflammation, they get dizziness, or vertigo, or whatever the case may be. Someone may be suffering from degeneration in their hand from injuries, some kind of arthritis, so when they get inflammation, it just goes right to where that injury is.

And if you have that, even though it sounds terrible, it does give you a clue that your body's inflamed, so if you have an injury that gets activated, it's a clue that there is something triggering that response, and for some people making a drastic change to their diet makes a huge impact on those types of symptoms. So they kind of have an early signaling system that their body's inflamed because they actually feel it wherever their past injuries have been. Now, when you're looking at this whole systemic inflammation part of it, it's really a battle that we all have to deal with as we all get older. Some people end up with conditions that turn on the immune system very aggressively, that really then promote this chronic systemic inflammation response.

Now, when you're looking at... What causes inflammation? So first of all, you should know that your anti-inflammatory system that fights inflammation starts to decline as you get older, so just age alone for many of us is going to start to decline our ability to deal with inflammation. So as we get older we get more inflamed, and sometimes what we call aging, and just not feeling good, and not being able to recover, and body hurts all the time, and can't think, and can't focus, is really just based on the inflammatory system being activated without enough counteractive anti-inflammatory mechanisms. So when you're looking at inflammation, the next question to ask is, okay so, I feel awful that I have inflammation. My brain slows down and my body hurts, wherever there's injury, it gets worse, and if it's in the GI tract, you could have breakdown of your tight junction, you could have bloating and distention, and all the things that go along with that as well.



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So if you're systemically inflamed, then they go, "Well, what causes inflammation?" So there's two main causes for inflammation. One is an imbalance of free radicals versus antioxidants, and when we say antioxidants, your body makes its own antioxidants and then you can also eat foods that are high in antioxidants. Some people supplement with various antioxidants, but if your body's having more free radical production than antioxidants, then you can definitely have a higher degree of inflammation. So let's talk about that for a second, so a free radical, what's a free radical? A free radical is basically a molecule that's going to oxidize or accept an electron. So think of it this way, there are some chemicals that are free radicals that will basically change your other cells. They'll take an electron from another cell, and that'll cause those molecules... I'm sorry, they take an electron from a molecule, and when they take a molecule from that cell, that cell gets destroyed. So things that are free radicals are things that are harmful to us, and one of the things that makes them harmful to us is because they impact our molecules.

Formaldehyde, or benzene, or chemicals in the environment, toxic poisons, those things are all classified as dangerous for us or carcinogenic because they're high in free radicals. And these free radicals are unstable molecules that have to take an electron, and this then causes tissue destruction. Now, our body's defense against free radicals that we're all exposed to is to make antioxidants. And there's different antioxidant systems in the body, one involves the production of an antioxidant called glutathione, and one involves the production of an antioxidant your body makes called superoxide. One of the things we know is just that aging alone declines the activity of the enzymes that make our own body's natural antioxidants. That's a key thing, that we can have decreased production of antioxidants, so as we get older, we become much, much, more sensitive to free radicals.

Now, free radicals could just be environmental, free radicals could be pesticides, chemicals in food, free radicals could be in your home, maybe you have lots of chemicals in your home. But the point is though you may be a certain degree of sensitive to car exhaust, or cigarette smoke, or something, or you may feel worse when you're around those things. That's the basic concept of one main mechanism of inflammation, so one main mechanism of inflammation is you get exposed to free radicals and do you have the ability to have enough antioxidants to deal with it? And the way antioxidants work is these free radicals are trying to manipulate electrons and what the antioxidant does is just takes the bullet, so your cells don't get injured. So instead of a free radical going through and, let's say, damaging your joint, or damaging your brain, or damaging another tissue in your body, an antioxidant comes in and then stabilizes that free radical molecule so it can no longer injure cells and then your tissues are protected.

Now, if you don't have enough antioxidants, those free radicals destroy the tissues, and then those injured cells then activate your immune system to destroy them, and that



triggers the whole inflammatory response. When we say inflammatory response, when the immune system has to get rid of tissue, or deal with a pathogen, or get rid of a cell that's been injured by a free radical, it produces what are called cell protein cytokines. These cytokines then cause what we call inflammation, so that the activation of brain fog, muscle weakness, the mitochondria making energy not working, those are all generated by the immune system.

So in a sense, you get exposed to, let's say, I don't know, air pollution. Air pollution is going to have a different impact on different people, one of the reasons being not just the chemical, but their preexisting antioxidant status. So if these molecules come in, and there's lots of free radicals, for some people, they'll have a high degree of antioxidants produced. They'll immediately quench it. There's no effect. The person doesn't notice anything. For someone else, their free radical load is greater than what they have enough antioxidants for, so then the free radicals start to destroy tissue. Once the tissue gets destroyed, the immune system has to now get rid of these injured tissues. It gets activated, produces these proteins, and the whole body gets inflamed.

So one of the most overlooked things is just this relationship between free radicals and our antioxidant systems. Now typically, we're going to go back to this in a second here, but what helps us make our own antioxidants? One of the most impactful ways to raise your antioxidants is basically, do exercise and when you exercise, what happens is you actually create oxidative stress. Your body is actually in the exercise period where tissues are breaking down, and you're tearing muscles, and you're running, and hitting your tissues, and those tissues are dealing with the trauma, that's actually an inflammatory state. So you actually create some free radicals when you exercise, but then what happens is after you're done exercising your enzymes called glutathione peroxidase and superoxide dismutase, these enzymes get turned on, and you get high production and massive production of antioxidants that last for hours, and hours, and hours, and hours after your workout that then have a protective effect.

We know that, for example, one of the best ways to raise your own antioxidants is to exercise. And this is why when people start to get really inflamed, they go downhill, because just exercising is really hard for them, because their body hurts, and they feel tired, and they can't recover from a workout. But once they figure out how to break through that and start to move, and start to work out, they'll start to make their own antioxidants and they notice they're not as inflamed as they used to be. So inflammation is critical and many studies done on pain, chronic pain management, because inflammation drives pain, has really found that the single variable that has the biggest impact in getting rid of chronic pain syndrome is to have movement and exercise, so that movement and exercise is actually changing the chemistry of your body to make your own antioxidants.



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Now, foods can do two things. Foods can support the enzymes that make antioxidants. For example, one of the main antioxidants your body makes is glutathione. Your body needs things like vitamin C. It needs things like sulfur from your foods, like garlic and onions. It needs selenium. It needs a healthy diet in order to be able to make those, so if your diet's not healthy, you may not be as optimal at making antioxidants. And studies have shown when people take things like N-acetylcysteine, or selenium, or vitamin C, their actual antioxidant enzymes turn on, like glutathione. So we know that healthy diet is important, and movement's important, and what happens to a lot of people that get chronic is they get stuck in this chronic inflammatory cascade and they don't realize that the free radical part of it is an issue.

Now, I said there's two things that cause inflammation. One is free radicals, which we've been talking about for a while. The second one is activation of immune cells and your immune can be activated by the environment. It could be from foods you ingest, it could be from infections, or it could be from environmental chemicals. And one of the things that happens as we get older, as time goes by, is we lose what's called immune tolerance. Immune tolerance is our body's ability to determine how much or even to react or not react against a foreign compound. The foreign compound could be a food protein, the foreign compound could be a pathogen, the foreign compound can be a chemical, or things like that. The ones we're really concerned about are chemicals and foods, we want our body to be able to deal with pathogens.

So once we lose our immune tolerance, which happens when we get older we start to develop more food sensitivities. We start to react to the environment more, and that's different than the antioxidant system. Its own model, and when the immune system starts to dysregulate and you start to lose this immune tolerance pathway, you can also have greater inflammation. As we get older, a lot of times... I'll give you an example. Sometimes I'll see a patient and they're chronic, maybe I see a patient who's 35 or 40, and they're really not feeling well for whatever the reasons are. And I go, "When would you say it was the last time you felt normal? What's your goal?" And they're like, "I'd to feel like I did when I was 18." I'm like, "Well, there's a lot of things that are not going to make that possible to some degree. As we get older, we have things that happen to our cells and tissues."

Now, that's not to say that some people don't. Some people have very, very, fit immune tolerance and a very, very, high antioxidant production, and they feel like they're 18 even though when they're 40. But for some people, they just think that's expected. Well, it's not expected. We have some sort of decline in our antioxidant producing systems and our immune tolerance pathways, so when you combine our body's inability to make antioxidants as efficiently as possible as we get older and you combine that with as our immune system tolerance, our ability to not react to foods and chemicals goes down over time, now you get this pattern where a person becomes very, very, prone to have foods, and free radicals, and chemicals trigger inflammation, and then they get



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inflammation. Most of the chronic diseases of aging are really inflammatory diseases and those that are most inflamed seem to suffer from those.

And then you have people that throughout their entire life they've worked out, they've exercised, they've ate really well, they reduced unhealthy foods. Foods can have free radicals, like when you fry foods, you're eating free radicals. Bronzing, caramelization of foods, or barbecuing foods, the charcoal, those are all free radicals, so if someone's been eating a lot of foods that are very inflammatory, and not eating enough anti-inflammatory foods, that can be an issue. Now, we also can get antioxidants from our diet. Instead of making our own, we can get antioxidants we ingest that then protect us from free radicals in our environment. And then those antioxidants are basically foods that have a lot of color, like blueberries, acai, broccoli, salmon, those have very high levels of antioxidants that we can ingest that are there in our system to protect us against these other free radicals.

So we can go back to the topic, how diet and inflammation impact your whole body. Let me just recap really quick just to make things simple. Diet and inflammation affect the whole body by two mechanisms, one of them is you have greater pro-oxidants and antioxidants and number two is you start to lose your immune tolerance, so then you start reacting to the environment and chemicals from an immune cell perspective, not from a free radical perspective. So it's not uncommon to see these things change. Now, as someone that gets older, all of us as we get older, we can really try to optimize, first of all, our antioxidant strategies. Optimizing your antioxidant strategies would be number one. Studies totally show that exercise and movement make a difference, so if you exercise regularly, you'll have a higher production of antioxidants and once you get in that routine then you start to develop those on your own. When you become sedentary, you produce less antioxidants.

The other key thing is you can ingest foods that are high in antioxidants. Eating very good, colorful vegetables and fruits really have high source of antioxidants. You can supplement with antioxidants. You can take super foods, like acai extract, or blueberry extract. You can take things like vitamin C or vitamin E; they have antioxidant properties. There's no shortage of different antioxidant supplements in the nutritional world. There's lots of things available. So those are things you can do with the free radical part of it. At the same time, you can try to reduce your exposure to pro-inflammatory free radical producing foods, fried foods, partially hydrogenated foods, foods that come in a bag or box, caramelized heated foods, where you get change in the color of food, which tastes great, but those are free radicals. So those are the key things with that.

Now, as far as the immune part of it goes, the immune part of it is your antioxidant system, your immune tolerance system I should say, not your... The other part of the inflammation is your immune part of it. As you get older, you can lose your immune



tolerance. Now, the easiest way to improve your immune tolerance from diet and lifestyle, and we'll take questions here just in a second, so thanks for hanging in there, is by diversifying your microbiome. So if you eat a diverse list of vegetables and fruits, and hopefully very diverse color vegetables and fruits, you can then also improve your gut immune tolerance, which will make you less reactive to foods and chemicals from the environment if your tolerance improves and your microbiome gets more diverse, and that also provides antioxidants. It always comes back to the same thing, if you eat a diverse list of vegetables and fruits, and exercise and move, you have significant degrees of protection.

Now, there are times when people do that and they're still inflamed, and a classic example is a patient that has an autoimmune disease. A patient that has an autoimmune disease may go, "Listen, I exercise every day. My diet's super clean. I take handfuls of antioxidants and supplements. I still have inflammation." Well, that's the condition now. That is a disease or dysfunction in the immune system that is making a person more prone, and if a person has autoimmunity, then they have to especially make sure that their antioxidant status levels are greater than their free radicals. They have to really make sure that they're... thank you. Hi.

Hi.

That the microbiome is diverse and they can really improve their immune tolerance. So we do have a... I should also... By the way, we did just launch, before I get to questions, we did just launch our Gut Puzzle program. It's now available, people are enrolled, people are taking it. We're doing live questions and answers in our community of people who have enrolled. That's there if you're interested in taking it. The Gut Health, Solving the Puzzle program walks you through how to support your gut and really implement strategies to how to figure out what you need to do, what you need to support, and try to go through the whole process. So if you check out Dr. K. News, D-R-K-N-E-W-S .com, you'll see a program called Gut Health, Solving the Puzzle, and that's our newest program, and it's just launched a few days ago. So you might want to check that out or if you have an interest.

Okay, we also do have a course on oral tolerance, where we talk about all the mechanisms of oral tolerance in greater detail, and how it all works, and the immune system behind it. If you have an interest in that, you can also check that out at Dr. K. News.

Okay, questions.

Hi.

Hi.

**Okay. So Karen is asking, "Does consumption of alcohol produce free radicals?"**



Yes.

No.

So consumption of alcohol does produce free radicals and this is not the best thing. So aldehydes, they have the ability to destroy tissue and then trigger that whole inflammatory response. Alcohol is definitely not a super food. It's not-

Says you.

Yeah. It could be super great for you at certain times, but it's not super food.

**Just kidding. Okay. Tamara is asking, I think that's how you say it, "There are so many supplements that are labeled quote unquote anti-inflammatory like turmeric, omegas, glutathiones, whatever, but they never say what kind of inflammation it's addressing. Is it possible to link a supplement slash foods you're eating to specific types of inflammation?"**

Right. Basic-

Does that make sense?

Yeah.

Okay.

It's not that simple. [crosstalk].

Simple.

Yeah, so when you're looking at what's an anti-inflammatory or antioxidant, things that are anti-inflammatory and antioxidants share similar properties. What they do is they really protect the body from free radicals, and there's different mechanisms for different things. So you'll have a list of anti-inflammatory things like, I don't know, vitamin E, vitamin A that have an impact on free radicals. Then you could have things like fish oils that may impact a specific pathway of inflammation called prostaglandins and leukotrienes, then you may have another compound that's an antihistamine that blocks histamine, so [environmentologies] don't trigger the immune response. Then you have compounds like resveratrol or turmeric that block a specific pathway called NF Kappa B, that triggers the inflammatory vicious cycle to produce these proteins within the cell. In reality, a lot of these compounds kind of do a lot of these things all at once, so it's going to be hard to do that.

Now, in a real clinical setting, if you see someone whose got lots of pain and inflammation and you just see that they don't have any healthy fats in their diet, they may benefit from fish oils because that may be a prostaglandin pathway. If you see someone who has lots of chronic pain and inflammation that just don't eat any antioxidant foods, things like turmeric, resveratrol, pomegranate extract, acai, could be



very beneficial. And if you just want to get a spectrum of all the different antioxidants, I would say the top ones would be, or anti-inflammatories I should say, would be resveratrol and turmeric. There's lots of good research behind those, very effective. Pomegranate extract I really think is fantastic. Acai extract is really fantastic. The classical ones, vitamin A, vitamin C, are very simple and easy. They have very good antioxidant properties. And then, if you can find liposomal glutathione, which is an easily absorbable form of glutathione, that would be a really good way to support your antioxidants.

So I understand what you're saying with the frustration of trying that pathway you want, you're just a very intelligent consumer that most nutritional [inaudible] manufacturers don't really think about.

**Okay. Leah is asking, "Do you consider CRP on a full blood count a good starting point to look for systemic inflammation and what number do you consider acceptable?"**

Right. So for those of you guys that aren't familiar, there's a blood biomarker that gets ordered on routine blood tests called C-reactive protein. And C-reactive protein is a protein that's synthesized in the liver. Remember I told you, when you have an immune response, these immune cells release cytokines, these proteins that then trigger the immune response, those cytokines end up in the liver. They get metabolized to a protein called C-reactive protein and this is why it's been used as a general marker for inflammation, so if you have a lot of inflammation, then your C-reactive protein levels can go up.

Now, the laboratory ranges are pretty useful with C-reactive protein, and when you start to get levels above three or above five, there's definitely inflammation. Some people have C-reactive proteins of 50, some people have C-reactive levels even higher than that, over 100, but there's people that have significant and severe inflammation and they don't show up with any abnormalities in C-reactive protein. And part of the reason is because they're making cytokines in a different pathway that doesn't metabolize into C-reactive protein. So C-reactive protein isn't the measurement for all inflammation. However, if you have a high C-reactive protein, let's say your C-reactive protein levels are nine, you can use that as a baseline to see if your inflammation is going down.

Now, typically, when you see your C-reactive protein's really high, let's say above five or six, there's some kind of usually inflammatory condition. It could be an infection. It could be an autoimmune disease. It could be anything really that's triggering your immune response that's chronic, so you really want to try to identify it, but don't let C-reactive protein be your only biomarker, because not all inflammatory pathways will increase production of CRP.



**Okay. [Kai] is asking, "In your book, Why Do I Still Have Thyroid Symptoms, you recommend glutathione and dismutase as liposomal creams. Why is that better than oral supplementation?"**

So there's different ways to take antioxidants, liposomal cream is a way to really... So some liposomal creams can get into actual circulation and have an impact on raising levels. Also, a lot of liposomal creams can be applied to get it right into the tissue, so if you have a muscle injury, or if your son's got a swollen thyroid gland, or they have a swollen tissue, a joint, or something, the liposomal delivery of a cream can help get it right into that tissue. When you're trying to deal with systemic inflammation, it's really nice to take an oral supplement and have the effects go through your gut and make a big difference there.

**Okay. Is liposomal glutathione suitable for children? If so, what per body weight?**

Yeah, so liposomal glutathione is just an antioxidant. There's not contraindications for age. It's just basically sulfur and some basic amino acids that are typically found in food. Dosage isn't based on age or body weight. The type of glutathione you can take sometimes can cause stomach irritability if you take too much, but there aren't any specific guidelines or standards for glutathione levels based on age and dosage. So what you're really left with is what's available to you when you go to the health food store, and you have, let's say, a source then you can try the standard dose and see how they do. And if it's a child, you can start small and work their way up, and make sure that their system can tolerate it, because things like some antioxidants your body has to be able to digest them, like glutathione and your body has to be able to process sulfur. It's very high in sulfur. Certain flavanoids, the fibers, your body has to have fiber to digest them as well.

Okay, Susan is also reminding people you have a full talk on glutathione through this Facebook [crosstalk].

Oh yeah. Thank you, Susan. [crosstalk].

She just put a link.

Yeah, we did a whole presentation, or talk, chat, I don't know what we call these things, on glutathione. Thursday talk.

**Thursday talk or Thursday noon. Okay. Jenn is asking, "Can insulin resistance be a source of chronic inflammation?"**

Yes. Absolutely. So insulin resistance is one of the major causes of chronic inflammation, and it triggers the immune response, and it also creates free radicals and oxidative stress. So it activates both things that we talked about. Insulin by the way, insulin is a hormone your body releases when you eat sugar or carbohydrates. Any time your glucose levels go high in your bloodstream, your pancreas releases insulin to get



that glucose into the cells, so then you can use it for energy, but when people eat too many carbohydrates, or too much starch, too much sugar, the receptor sites that respond to insulin don't work as well and the body starts to become what's called insulin resistant. In order to compensate for that, those receptors not working, the pancreas pumps out more and more insulin.

But insulin will do a few things, insulin will have a tendency to, as a hormone, trigger inflammatory responses with immune systems, so your immune system gets greater aggravation. And then also, if a person gets insulin resistance where they can't carry the glucose they had from their meals into their cells, free radicals start to destroy that glucose and produce what are called advanced glycation end products. And these become super, super, strong free radicals and they really destroy tissues. This is why diabetics end up with neuropathies and nephropathies. The kidneys get injured, the nerves get injured because of this glucose that gets converted by free radicals into a stronger free radical that then starts to destroy tissue, so insulin resistance will definitely cause inflammation without question.

And your biggest clue, by the way, you have insulin resistance, is when you eat a meal, you get tired, and you fatigue, and you want to take a nap. That's a sign of some degree of insulin resistance. What should happen when you eat a meal is you're just not hungry, but if you eat a meal and you need to crash, you need to take a nap, that's a sign of insulin resistance.

**Okay. [Karis], "If someone has chronic inflammation, can too much exercise be counterproductive?"**

Yes. Yes, so if you have chronic inflammation you have to be careful with exercise because it's like in order for your body to make antioxidants from exercise, you got to get past that window of actually making free radicals. So if you have, for example, a person who's got really severe inflammation, like a patient with autoimmune disease, or a patient with diabetes that has really high insulin levels, they may exercise and they may crash and be in bed for days, and days, and days, because their free radical load was so much already and then they added more free radicals to it, and their antioxidant jumping in couldn't compensate for that. So now, they're just inflamed from their workout.

So you see it all the time. You see people that have chronic inflammatory conditions, whether it's an inflammatory bowel disease, or diabetes, or an autoimmune disease like Hashimoto's, rheumatoid arthritis, or whatever, those people are extremely sensitive to exercise. They have all the best intentions to exercise but they just crash and get worse. And so with them what you have to... With people that are suffering from that, what they have to do is they have to work their way up, so maybe they go for a light walk or jog and go there. Or for some of them, they have to really clean their diet. They got to get rid of foods that they're reacting to, the most common ones are gluten, dairy, soy, egg.



They have to start eating a diverse vegetable plant fiber diet, diversify their microbiome, get rid of the fried foods, and really change their free radical's inflammation load first and then implement exercise, so they don't crash and fall apart as much, but those things absolutely happen.

You have to have some degree of potential to, when you exercise, to get through that free radical initial response to then make your own antioxidants. And if you can't get through it, then you may have to work with diet and lifestyle, diet and nutrition, to then change your free radical load down a little bit, and maybe even take some antioxidants, get that up, so then you can start to exercise and not fall apart.

**Okay. Alexander is asking, "What is the relationship between inflammation and stress?" Oopsie, hold on.**

Right, so this is-

It went away. Basically, what he was saying, when he gets stress symptoms, his tennis elbow flares up.

Right. So there's relationships there that are published in the literature, and it's part of a mechanism called neurogenic inflammation where high stress activity in the brain turns on the stress response in the brain., and this then turns on chemical pathways called C fibers, C fibers in different inflammatory substances, like substance P, that then cause inflammation. And it's not just... So lack of sleep also causes that, and stress causes that, unhealthy social relationships cause that. So you can get inflamed not just from diet and food, you can get inflamed from unhealthy relationships, you can get inflammation from lack of sleep, and just from stress in life. Those things can all really trigger the inflammatory cascade. So the mechanism that's known to cause these is neurogenic inflammation and this is part of what they call the neuroendocrine immune response, neuro being brain, your cognition, your thoughts. Your brain needs to have sleep for this system to work. Also, unfortunately, as we age, our neuroendocrine immune system becomes less efficient so we're more prone to this neurogenic inflammation.

No.

Yeah. So the key thing is, as we get older... Listen, as we all get older, you have really make sure you focus on improving your gut.

Absolutely.

And improve your microbiome diversity, and really eat a lot of antioxidants. Your body's not making as much as it used to. It's really important to get some type of physical activity in. Now, sleep really matters. Social relationships really matter because they can really make you unhealthy. You can really not function well, if you are at an event where you get so stressed out being around certain people. All those things start to make a



bigger difference on your physiology as time goes on, so they're important to address. So thank you for bringing that up. Yeah, you can definitely have neuroendocrine responses as a trigger for inflammation. These are all under the field of neurogenic inflammation. It's basically stress, or sleep, and all these social relationships can all do that.

Yeah, that's [inaudible] stuff.

That's important too, because you can have someone who's really inflamed, they're going, "I don't have any more foods to cut out. I'm taking handfuls and bags of supplements." Then you go, "What else is going on?" "I hate my job. I hate my spouse. I'm not getting enough sleep. I hate everything." And then, it's like, "Well, that's going to cause inflammation from a different mechanism."

**Right, exactly. Okay, so then Vera's asking, "What are markers of neurogenic inflammation? Is there any way to measure them?" Measure it, measure them.**

There's no laboratory test to manage your neurogenic inflammation commercially, like you, as a patient, walk in and do it. These are all done in research labs with specific tissue cultures and cells. So you can't just go to your doctor and go, "I want to get my neurogenic inflammation system checked." We don't have the ability to do that.

**Okay. Okay. Jimmy's asking, "Can turmeric be helpful for dampening inflammation no matter the source of the inflammation?" Is it just a good general overall inflammatory dampener, turmeric?**

Turmeric has curcuminoids, and curcuminoids... Not all turmeric is the same, by the way. So the higher the active curcuminoids is going to be a factor on how much inflammation it quenches. Whenever you use turmeric, you want to use high curcuminoids, active curcuminoids, to really support you, and the curcuminoids have a general anti-inflammatory effect. There's multiple review papers published now on benefits of all different types of mechanisms throughout the body. So it would be a good idea just to take... Everyone's got to have to look in their life and go, "What's the cost benefit value?" For some people, they'll take turmeric and go, "I don't feel any better. It's not worth the cost for me." For other people, they're like, "I'm going to take turmeric because I believe in prevention and I think it's going to help me over time." People have different cost benefit ratios.

In our family we take flavanoids and curcuminoids, everything, every day. I take them. I don't necessarily notice a big difference but I trust the physiology that it's impacting over time. It's going to have a positive effect for me, so the cost benefit is there for me. For other people, it may not be. So turmeric is a very good general antioxidant and inflammatory compound, but it may not be your mechanism. You may have your inflammation triggered by the environment, by pollen, or things that you breathe in, or dust, and maybe a natural antihistamine will be a greater anti-inflammatory for you.



You could be a fat phobic person and never eat any healthy fats, and never eat avocado, and never eat fish, because you don't like the way fish tastes, and you really don't have any prostaglandins that are anti-inflammatory that come from those. So for you, taking turmeric wouldn't have much difference, but if you took a very high quality fish oil that may have a difference. So yeah there are some specifics, some people will only respond to one thing or another and there has to be some trial and error at times to figure that out.

**Yeah. Okay. Thomas is asking, "What do you know about chronic inflammatory response syndrome?" That's a big question. Sorry. It just popped up.**

Chronic what?

Inflammatory response syndrome. Do you know what that even is?

I mean, it's just an immune system that's already activated by some trigger and they don't know what to call it, so they call it a syndrome. A lot of people would fall underneath that category, to be honest with you. It's just basically a non-obvious form of chronic inflammatory triggers that are making the immune system over activated and it goes back to, is it environmental? Is it allergies? Is it sensitivities? Is it lack of antioxidants? Is it loss of immune tolerance? You kind of have to go through that thought process to manage it.

**Okay. Evelyn is asking, "As I have heavy metals, is it still okay to take glutathione?"**

Well, let me tell you, everyone's got heavy metals.

Yes.

You're not alone. If you get tested, most people, they're going to have heavy metals. Glutathione is not a problem for people that have heavy metals. As a matter of fact, glutathione can protect your tissues from the free radical part of heavy metals and then glutathione has actually been shown to have some natural chelation properties where it can maybe bind and help eliminate some of those chemicals out of the body. Some of these have been done in animal studies. So glutathione is not contraindicative to heavy metals, it's actually, if you have any kind of environmental load, and you want to decrease the exposure in your cells with the free radical perspective, you should take antioxidants and glutathione is a great one.

**Okay. Debbie, "Do you see loss of tolerance happening with breast implants?"  
Loss of [inaudible] tolerance.**

Yeah, so loss of tolerance can happen from... Well, here's the thing, not everyone who's going to get breast implants is going to get sick and not everyone who is exposed to a chemical is going to have a reaction. So there's different things that cause loss of



immune tolerance, and for those, by the way, that have already lost their immune tolerance, they may be the ones that really react to a breast implant, or really react to bad air quality day or something like that. But you can lose your immune tolerance from lots of different mechanisms, it could be chronically exposed chemicals can destroy glutamine cells. You can have inflammatory diet that breaks your tight junctions. You can have various things that disrupt what are called regulatory T-cells. We don't really know all the different triggers that cause someone to lose immune tolerance.

But implants themselves shouldn't cause you to lose tolerance to some degree. However, for some people that are extremely sensitive to the chemicals in implants, and they don't have enough antioxidant reserves, and that can start to break down barriers, so it's possible they can play a role, but it's not directly linked that if you get implants you're going to lose tolerance. You may lose tolerance because your immune system's not healthy enough, your antioxidants are already not there, and then that increased chemical load adds another factor into the overall load you have that then may tip a person over the edge.

Okay. I don't really understand this, maybe you will.

Okay.

**[Trida] is asking, "Some say taking supplemental glutathione messes up with the natural body, the natural process of glutathione."**

No. That's-

I don't know what that means.

Taking natural glutathione antioxidants is not going to interfere with your own body's ability to make it. That's not how this works.

Okay.

Yeah. If people say, "Well, you shouldn't take it," like, "No. You should take it."

Okay. I don't know. Sorry [crosstalk].

No, it's not going to. That's not how these enzymes work.

**Okay. I shouldn't ask this [inaudible]. Sorry. Antoinette is asking, "Will the Gut Puzzle program, can help with SIBO?"**

So in the Gut Puzzle program, we actually have whole section on small intestine bacterial growth and SIBO, and talk about diet and lifestyle. Will it impact you with SIBO? I have no idea. Some SIBO cases are chronic injury to the nerve plexus. It's not about fixing it, it's just about how to function best with it. Sometimes SIBO's secondary to something like hypochlorhydria and that's an easy fix, so it really depends on what the mechanisms are for it.



But in the Gut Puzzle program, we go over... The Gut Puzzle program, what we do is we basically teach you how to go through an understand what does a pancreatic enzyme deficiency look like? What does a pattern of small [inaudible] look like? What did dysbiosis clinically present? Which one of these symptoms do you have? Do you have intestinal permeability? What do you do for it? How to work what we call north to south, where you're managing the things in order to have the best clinical effect. And then we have cookbooks, and workbooks, and different things to really help you through the whole process, so you can understand the big picture. The more educated you personally become on how the gut works, and how it can dysfunction, and what's been published to help each of these pathways, the easier it is to figure out what is going to work for you and the right questions to ask when you're working with other health care providers, and where to seek more information. It'll definitely educate you, as far as any direct effects for your SIBO, it's possible or it may do nothing.

**Okay. If someone has a sulfur... Hold on. Gail is saying, "If someone has a sulfur sensitivity, would taking glutathione be problematic?"**

Yeah, for people that don't do well with sulfur, taking glutathione usually doesn't work because glutathione is pretty much sulfur. The majority of the glutathione compound is sulfur, so if you're sulfur sensitive, you're probably better off using different antioxidants. You can use grape seed extract, green tea extract, acai, whatever. They're all going to be beneficial.

**Someone is saying, "What if I can't have fermented foods, when so much info said it's what you need for gut health?"**

Yeah. I mean, listen to your body. Some people cannot handle certain fermented foods. The issue with a lot of people who have fermented food issues is that they just may not be able to handle a big load at once. They have to start very slow or their microbiome is just not able to handle it. So you have to, as we say, work north to south. You may have to improve digestion first. You may have to slowly start to make changes to the microbiome, so you're actually able to tolerate fermented foods. If you can't tolerate fermented foods, that's a really bad sign. That means you probably have... I would only guess some significant degree of dysbiosis where you can't handle a fiber load into your system. You've got to figure that out.

**Okay. Owen, "What is the relationship between cortisol levels, inflammation, and the health of the gut?"**

Wow.

That's an easy one.

**What is the relationship between cortisol levels, which your body releases under stress responses.**



Okay.

Okay. Yeah.

Oh, crud.

Oh, you lost it.

Yeah, it went away. Hold on, I'll think of it again.

Well, cortisol-

Inflammation and the health of the gut.

Inflammation and the health of the gut, okay. Cortisol has a bidirectional effect on its impact on inflammation health of the gut. So cortisol, in the initial stages of its release, like when you have an acute stress, is inflammatory. It has an inflammatory effect, calms everything down. This is when people have a joint injury, they get a cortisone shot. It immediately dampens the inflammation. That's different than long-term chronic cortisol, so long-term chronic cortisol is going to really affect the body differently. There's a difference between acute response to stress that you need to release cortisol versus chronic, unhealthy, stress that causes cortisol levels to stay elevated. And chronic, unhealthy, cortisol levels will put the body into what's called a catabolic state. Anabolic state, your body can recover, you can build muscle, you can grow, you can regenerate. Catabolic, your body's just breaking down and it can't recover very well, so when people have high cortisol is they get into a catabolic state. They can lose their barriers. They can lose their lung barrier. They can lose their blood brain barrier. They can lose their gut barrier. So now, proteins can trigger their immune response, really promote inflammation.

So when we look at cortisol, in the acute stages it's beneficial for inflammation and even the health of your gut. In chronic cortisol states, it can have this catabolic effect, which can then really disrupt your barriers and really promote some inflammatory responses. Good?

Yes.

Question.

**Uh-oh. There's outside [inaudible] I need to go to that I got to find it. Okay. "What about histamine being increased by fermented foods, especially with someone with-**

Yeah, we did that... I'm sorry go ahead.

... has DAO SNP? Sorry.



Listen, if you have a real true DAO issue and you can't handle histamine, you have histamine intolerant mast cell activation syndrome, then you may not be able to handle fermented foods. You're right.

Oh, real true one.

Right, real true one, you really have that confirmed. The antihistamine diet has become a really trendy diet. It's really having people avoid foods that are really healthy for them, like fermented foods, because they think that anyone that has lots of food sensitivities must reduce their histamine levels. We did another chat, talk, on mast cell activation syndrome histamine, we went into all the details behind that. But yeah, if you actually truly have DAO enzyme inability to deal with histamines, then certain fermented foods will be difficult for you to tolerate. If it's not that, then you got to really look at the microbiome.

**Okay, so [inaudible] is asking, "What about when cortisol is too low?" But there's no reference to what they're talking about. I'm sorry.**

Yeah, so if cortisol is too low, it's probably in relation to gut inflammation, if cortisol is too low, then you don't have that... Sometimes, you might need to have that cortisol spike up, so you can have that inflammatory effect. You can also see people that have chronic pain and inflammation, where they just don't have any cortisol reserves anymore. Again, cortisol should be able to spike up when there needs to be an anti-inflammatory effect and just burst out, and that really calms everything down, so if you're flat lined and you can't really raise your cortisol, you may have some inability to adapt or deal with stress, inflammation I should say. You're going to have to have this balance of cortisol. You need to be able to produce it when you need to, so if you're flat lined, that's not good. And then, if it's high all the time, then that puts you in a catabolic state, which is also not good. It's got to be, again, balanced.

**Okay. Susan's asking, "On the Apple Cider Vinegar Challenge ebook, Dr. Kharrazian says, if you are unsure whether you have a high or low stomach acid, ask your health care provider to run a lab test to measure your stomach acid levels, which lab test does he recommend to determine this?"**

Oh, that's the gastric Heidelberg test. That's a lab test. You can find it out there. It's the gastric Heidelberg test.

Say it again.

Gastric Heidelberg test.

**Okay. Okay. "High dose vitamin C can help with mast cell activation." Did we do a talk on mast cell activation?**

Yeah, we did a talk on that.



Because people probably should look at that.

Yeah, next question.

**High dose vitamin C, okay [inaudible]. "Can you speak to chronic constipation? Even though I'm eating a whole foods plant-based diet, relieved by magnesium citrate."**

Right. So there's a lot of people that suffer from chronic constipation and just don't know why, and they're eating healthy diet, and they can't figure that out. This is exactly why we put together the Gut Puzzle program to go through each of these steps. So intestinal motility is a really important mechanism in order for you to have normal digestion and intestinal motility isn't just based on the foods you eat. Intestinal motility is based on your brain to gut access and all the nerve plexus in your gut.

Now, certain gastrointestinal conditions can impact motility, like if you have bacteria that produced a lot of hydrogen, your gut motility, your bowel movements are much faster. If you have lots of bacteria that produce methane, you may have your gut motility shut down, so you could have a dysbiosis SIBO that could be causing that, but it also could be just because the brain gut access isn't working. Some people get chronic inflammation in the gut and their gut nervous system degenerates. Some people get early neuro degenerative diseases that impacts their gut and they start to have their nerves in their gut degenerate, and they have motility issues. Those are some of the things you should think about.

Brain gut access pathway and inflammation in the nerve plexus, it's actually a red flag. You really want to make sure you don't have any signs of past head injury that could be impacting your overall health. You want to make sure that you don't have any early signs of Parkinsonism. Really, Parkinsonism shows up in the gut first, the earliest symptom is chronic constipation that can last for 10, 20 years, way before anyone develops tremors, then followed by stiffness and rigidity. We go through all that in the Gut Health Puzzle program, by the way, and if those symptoms are there, then you really might have this neuro degenerative battle that you're dealing with. For some people, if their nerve plexus is starting to degenerate, then you're going to have to take stool softeners and magnesium to optimize your gut function.

**Okay. "How do you know if you have chronic high cortisol levels? Is there a test you can run or do?"**

Yeah, if you want to measure your cortisol levels to see if they're high, there's two ways to measure... Well, there's different ways to measure cortisol. You can measure it in the urine. You can measure it in blood test, in serum, or you can measure it in saliva, so if you're trying to look at functional levels of cortisol that you're producing throughout the day, the best test would be a saliva cortisol rhythm. The blood cortisol tests that are available have ranges that are so broad that they're really only looking for disease, not



just your overall function levels and the urinary cortisol levels still haven't been validated enough to really trust them. Even though some labs will measure urinary levels throughout the day and do a cortisol map, those are still not substantiated. Whereas, the salivary cortisol test is without any doubt a substantiated, validated, test to measure cortisol levels throughout the day. You may want to look under salivary cortisol profile testing to look at your cortisol levels throughout the day.

Can you spell out the Heidelberg test please? [inaudible].

I have to spell it out. I have to look it up. I don't know.

Okay, we'll get back to that.

Yeah, get back to it.

**Okay. "Does poor methylation affect the gut in any way? Or does that just increase the propensity for inflammation throughout the body?"**

Say that again.

Does poor methylation affect the gut in any way?

Wait, wait, found Heidelberg.

Okay.

H-E-I-D-E-L-B-E-R-G.

One more time.

H-E-I-D-E-L-B-E-R-G.

Yay.

I think it's German. Okay.

I don't know. Okay.

Next question.

**Michael, "Does poor methylation affect the gut in any way?"**

No.

**"Or does that just increase the propensity for inflammation throughout the body?"**

Right. So poor methylation, so if you guys are familiar with it, methylation is one carbon group and your body has to be able to transport one carbon group through lots of different biochemical process your body needs. And the transfer of that one carbon group is called a methyl group, so methylation is that process. Hundreds of biochemical



mechanisms are dependent upon methylation. It's a really critical step of physiology. What they found is that when people don't methylate very well, that they can't convert an amino acid called homocysteine down to cysteine, that homocysteine is very inflammatory. This is why some people when they get routine blood test, their physicians will check something called homocysteine, because they found that having your body not methylate well and having this homocysteine stay around in your blood can really damage blood vessels. It's been clearly linked to risk for cardiovascular disease.

So if you don't methylate, you're probably going to have some issues with higher homocysteine, and that higher homocysteine can cause inflammation all throughout your body, including your tight junctions of your gut and create an inflammatory pathway, inflammatory imbalance that way as well.

Someone's saying, "Oh, like in Breaking Bad." I don't know what that-

Oh, Breaking Bad, right. Yeah, you're right. I should've thought about that.

I've never seen that. So, I don't know.

It's not for you.

**Oh, you know. All right. Okay. Good to know. Okay. That's funny. Oh gosh, hold on, sorry. Carmen is saying, "In the management of SIBO the FOD map, F-O-D map diet..." Right?**

Yeah.

Sorry. Facebook is so bad today. "Must be followed for how long or is it indefinite? Thank you."

Right, so for SIBO, the FOD map diet has to sometimes be indefinite. It depends on what the mechanism of SIBO is, so if there's actually damage and injury to the nerve plexus in the gut, then your body will let you know it's forever because the minute you deviate from it, you're going to feel it. For other people, there's other imbalances that may be causing SIBO, like for example, hypothyroid has been shown to cause SIBO, and they get their hypothyroidism treated and they no longer have to follow any kind of SIBO diet or guidelines. It depends on the mechanism, but the majority of people that have SIBO tend to have some injury to the nerve plexus, some degeneration there, and their body will tell them, "You need to get off fructooligosaccharides, and sugars, and starches, or you're going to have some severe bloating and distention. And I think we did a talk just on SIBO recently.

We did.



That's also available. By the way, if you guys haven't followed us on Facebook, you'll get access to all the different talks we're doing, plus it helps us. We're trying to grow. We would really appreciate if you can follow us on Facebook.

**So really quickly, Robin and Jamie are asking, "What factors do you look at to distinguish between chronic gut infections, like SIBO, autoimmunology, and can butyrate be negative for SIBO?" That's all in the SIBO talk. You go into depth.**

Yeah.

I just want them to know to please take a look at that, because it's a big topic.

Yeah, that was a big question, and we answer all of it in the SIBO talk, because I only have a couple of minutes. It just won't make sense. [crosstalk].

That's what I was trying to say. Yeah, please go to that. It's very easy. Okay. Sorry. The Breaking Bad comment just makes me laugh. I don't know. Okay.

One more question?

**Yeah. "Can you speak a little bit..." Oh my God. Sorry. The question was something like, can you speak a little bit about the antioxidant property of red meat?**

Antioxidant property of red meat.

Yeah.

Well, I don't really... Here's the thing, red meat is very high in arachidonic acid and some people absolutely need arachidonic acid to balance out their immune system, and that can have an anti-inflammatory effect. For a lot of other people, arachidonic acid is going to promote inflammatory pathways. There's a pathway for inflammation that produces what are called prostaglandins and prostaglandins can be anti-inflammatory or pro-inflammatory. Arachidonic acid promotes the pro-inflammatory, so if you're having someone that's just eating the standard American diet all the time, red meat will probably add to that arachidonic load. Maybe it's not significant at all or maybe for some people it is significant and causes inflammation. There's also high amounts of arachidonic acid in things like butter.

But if you take someone who just doesn't have any butter, or any fat, or any animal products whatsoever, and they're just not getting enough arachidonic acid, sometimes getting a little bit of arachidonic acid from whatever the source may be can actually have an anti-inflammatory effect. It's not going to be anti-inflammatory because of the nature of the substance in it. It's going to be anti-inflammatory based on if someone has a need of arachidonic acid or more likely for most people it would be a pro-inflammatory food. Anyways.



Okay, so one more, just a quick thing.

Yeah, that's fine.

**So Joan is saying, "Figuring this stuff out is life changing. It took me eight years, but the fire alarm is finally turned off, and my life has never been better. I'm 61 and I feel like I'm 16. Never give up."**

Who's this?

Joan. Her name's Joan.

Good job, Joan.

I know, I love it. I think that's fantastic. If they haven't registered for this program, it really does help figure out. It's complex. It's not just, take this, you're better. It's figuring this stuff out.

Yes, and in reality, people don't know this, but when you talk to people everyone's dealing with something.

Yeah, that's very true.

Even today is a great example, as we get older and our antioxidant is less efficient, and our neurogenic inflammatory pathways get more active, and we lose our immune tolerance, we're just so prone to developing inflammation. It's like we... And a lot of us just start thinking like we have to constantly put effort into trying to maintain our health and sometimes things take over, but ultimately, there has to be some active effort put into those things to continue to function and feel better. So thanks again, Joan, for sharing your story and please check out the new Gut Health Puzzle program, what is it called? Gut Health, Solving the Puzzle program.

[inaudible].

Dr. K. News, and please follow us on Facebook, and thank you all for joining me, and I hope you found something that was useful for you. Thank you so much.