## Opening Health Concerns and Podcast Intro

I think we're going to look back someday and say, what were we thinking giving our animals growth hormones to get them fatter faster? That's having an impact on us.

We're seeing girls maturing faster, sperm rates dropping. We're seeing autoimmune disease among children. When I was a kid, we used to call it adult onset diabetes.

Now the kids are getting it. The inflammatory bowel disease is rising among children. mental health issues are rising. And I believe what's happening, our detox capacity is totally overwhelmed by the onslaught.

Mold is getting stronger. And I also think we're going to look back someday and say, what were we thinking Welcome to the Peptides and Longevity podcast.

Each week, we'll dive into groundbreaking science, innovative therapies, and the future of health and longevity. Alongside visionary physicians and experts, we'll explore how peptides, cutting edge medicine, and lifestyle strategies can redefine the way we age.

Get ready to transform your health, optimize your vitality, and unlock the secrets to a longer, healthier life. Let's get started. Hello, this is Dr. Kent Holstorp with another episode of the Peptide Summit.

And today, a wonderful guest. It's Bob Miller with Functional Genomics, and he's going to talk about functional genomics with Bob Miller. Makes sense.

And thanks, Bob, for being on. He is one of my favorite people and been working with him for for a little bit and I've just been so impressed the way he's really kind of revolutionized genomics instead of just looking at you know genetic wise he's looking at you know functional genomics with a name very fitting and really shows you how you can treat these things.

## Guest Introduction and Functional Genomics Overview

and it's really allowed a number of things tells you not only what to treat with but what you don't need or if you're using too much of stuff or we've had patients who you know crash with glutathione i'm like what the heck and he shows you why It's incredible.

He's like a fortune teller when you're done. He knows more about you than you do. So thanks so much for being on and taking the time. I know you're so busy.

How many patients do you see a day? Well, I usually see people nine to 12 hours a day. So somebody knew an hour for a recheck half hour. So that can get up there pretty good.

But as I tell people, I just get to visit with my friends all day and help them out. So it's just, just a lot of fun. He's too nice. He's got to be a robot.

He can't be human. I'm real man. So he's a traditional naturopath, specialized in the field of genetic special nutrition. He's earned his traditional naturopathic degree from Trinity School of Natural Health and is board certified through ANMA.

In 1993, he opened the tree of life practice and has served as traditional naturopath for 47 years. In the past several years, he has engaged exclusively with functional, nutritional, genetic variants, related research, specializing in nutritional support for those with chronic Lyme disease, and really kind of everything, you know,

chronic multi-system disease.

And it's pretty amazing. I'll just ask him, I don't know, like, do you sleep? You know, damn. Well, I guess he knows exactly what's wrong with him. He can take exactly what he needs.

So great educator. And we've had him on in with the patient and it's pretty amazing. And it just correlates so well. We were very excited to have incorporated it into our practice.

And it was so many steps above, you know, other ones out there. I'm not trying to bash anyone, but it's just kind of like, okay, got this step to snip.

Okay. You're going to get Alzheimer's and, you know, and he'll tell you what to do. You can either. formulate, you know, the different things that tell you what supplements the patient needs or he can formulate them for you.

So it's really full service and very cost effective as well, which is nice. He's nationally, internationally a lecturer to educate health care practitioners about genetic variance and nutritional supplementation for achieving optimal health.

and holds live webinars every Thursday, which I highly recommend. And how would they find that? Go to naturalnemogenics.com? Well, they just go to our functional genomic nutrition website, and we'll put that up at the end.

You can then see how to get a free trial of the software, listen to the webinars, or subscribe, or just email one of our help people here, Yvonne or Chrissy, and they'll help you get on the webinars every Thursday or every Thursday evening from 8 to 9 p.m.

Eastern Standard Time. Yeah, it's all free and he has a training program that a, the first part is free if you want to continue or it's very expensive.

It's a minimal fee and he's really there to give back and he loves what he does. So it's, it's just repressing. He's created an online certification course on genetic nutrition for healthcare professionals.

He said it has over 900 healthcare professionals in the program. He's research and growing genomic research field. In 2015, he founded and personally funded, which is huge, the Neutrogenic Research Institute to research relationship between genetic variants and presenting symptoms.

His first research product on genetic variants and those with chronic Lyme disease. was one of two winners were researched by the ILADS, which, you know, they're pretty strict and pretty, you know, intense.

Meeting in Helsinki, Finland is phase two study of Lyme disease presented at the American ILADS Conference in November 2016. Phase three was presented at the International Lyme Conference in Paris.

So you got to go to some nice places. and his phase four study on mTOR and autophagy which I think is really an upcoming thing as well in Lyme disease represented in Boston 2017 and phase five was presented in Warsaw Poland, and there's a phase six.

Another winner in Chicago, Illinois, November 2018 showed increased variance in the heme pathway and mast cell genes, which obviously is getting tons of press, at least in the whole Lyme, you know, chronic illness group.

Phase seven presented in Madrid, been all over. In June of 2019, show genetic variants and gene related to production and utilization NAD, all huge topics right now.

And he's come with a lot of new theories, or at least I've heard, you know, NADPH steel, fentanyl reaction, he talks a lot about, and a research project on autism and pandas is being developed.

If I can help you out in any way with that, that's exciting stuff. He's created 88 nutritional supplements. He's a formulator for health care professionals.

Products have been based on his genetic research designed to support function that are impaired by genetic weakness. So it's so nice. You can just pick out what this person is going to need.

And I found is that, you know, you kind of gravitate towards what seems to help you. And when I look like Flavonoids who are a big part of my snips and I'm like, I discovered Flavonoids.

I just feel better. Like you don't know for sure, but so it's really interesting. He's a software creator, my gosh. And that's what I really like about his software.

It makes it understandable. You know, all these snips and so many companies, let's give you 10,000 snips. And it's like, oh my gosh, And they're having new generations of that and it organizes the genetic snips and really, you know, pattern recognition, which it can be daunting for the person starting, but he has a system that gets you going pretty quick.

So memberships, the National Association of Certified Natural Health Professionals, and American Association of Nutritional Consultants, and Board Certified Natural Path, and certified with the accreditation board there.

So again, Bob, thanks so much for being on. FCA, one of my favorite people, and I just love working with you and just kind of sit on the edge of my chair whenever you speak.

And again, those webinars are wonderful. And going through the tests with patients, they are very happy. It's really an added bonus for the patient. And I think patients are looking for that now.

you know it's it's becoming kind of the standard but everyone you know i think certainly bobs ahead of the curve and all this and you know developing the software to make it i remember when i was like writing research papers i go to the the medical library, try to find the journal, put it on the Xerox and get it.

Now it's information overload. And that's what I think of genetics. It's just, OK, here's a million snips. Like, OK, what do you do with it? So with your software, you call it's created functional genomic analysis.

We often think genetics like 23andMe, Ancestry, or professional geneticists to look at potential disease. Tell us about your functional genomics. What's the difference?

Sure. Well, as everybody knows, you can get 23 in me or ancestry. You know, see where your ancestors came from. That's OK. Professional geneticists, they're trained on which genes might be related to a disease.

Well, we're taking a completely different approach. And this goes back to the traditional naturopathic philosophy. It goes way back. And that is that inflammation is the root cause of most of our problems.

So I'll never forget me around 10 years ago I saw there was an article it says science has made a major discovery on the root cause of disease and that is inflammation.

And I kind of had a chuckle that you know the naturopaths were saying that about 100 years ago. So what we started looking at was can we look at the genetics and find out if there's a predisposition to more inflammation or if there's a predisposition to less than optimal antioxidants.

So what we did is we started digging into the DNA, and I had no training on this at all. I just sort of dug into it, fell in love with it. So rather than looking at disease, as you said, there are reports out there that look at your risk for disease.

We don't do that at all. We don't make any predictions if someone's going to get an illness because we're looking at function.

## Inflammation, Detox, and Personalized Genetics

So what we do in the software, we look at many different patterns where something might go wrong, where they might make more inflammation. Or we look at patterns where they may not make enough antioxidants.

Then you also have phase one and phase two detox. So we look at sulfation, glucuronidation. We look at how you're dealing with your fats. And the whole premise is this is personalized for the individual.

This is not the pill for the ill. This isn't like what do you do for this disease. We don't even talk about that. We look at how might the person be making too many free radicals, not enough antioxidants, and then more importantly how to compensate.

As we all know, the genetic pattern that you have, you received when you were born. At the moment, that sperm and the egg went together. Boom. That's you.

And we can get what are called SNPs, single nucleotide polymorphisms, or mutations they're called. And when we get those, The DNA may not be as effective in making an enzyme, so some processes may not be optimal.

So what we're looking at is where there might be something less than optimal, and then how we can intervene and either provide what the body's not making or support the enzymatic function that the body comes back into balance.

We're creating homeostasis. So you could see 10 people with the same condition, and you might have 10 different ways they got there. So in my opinion, this has to be care of the future personalized, not the pill for the ill personalized care for the individual.

And we're hoping that we're pioneering that to some degree. I think it's great. And it, it is a different approach than, Hey, you have, you know, Apple four gene during Alzheimer's.

Okay. Well, the next patient, you know, and it's interesting how put it together and it makes sense of their symptoms. And that happens a lot of times.

I'm talking to people and I start saying, I don't suppose you have fill in the blank and they have this surprise look. Okay, who are you talking to? How did you know this?

Well, when you understand functional genomics, it tells the story. Good example, there's two neurotransmitters inside the body. One is called glutamate, one is called GABA.

Glutamate makes you very intelligent, highly motivated, go get her. GABA is the don't worry, relax, be happy. By actually looking at the genes that turn the glutamate into the GABA, or the genes that make more glutamate, you can get clues if this person is high in glutamate and might have a hard time converting.

So many times with people with high glutamate, they'll be anxious. Tags on clothing bother them. Their mind races. On the other hand, they might be extremely intelligent.

They might be gifted or in the genius range. but they're dealing with anxiety. And you can see that by looking at the genome. Quite amazing how you can see the personality traits that might be there.

Same with histamine. If the person might be creating too much histamine, if they have difficulty in the pathways that clear the histamine, you can see if there's high histamine.

Then you can see if they have some of those histamine properties in their mental outlook, or they get rashes quickly, or they get hives, or they have overreactions.

So you can really look at someone's genome and get a good idea where their glutamate might be, their GABA,

where their inflammatory levels might be. And that way you can give customized care.

So if the glutamate's too high, we do things that either reduce the glutamate or support the glutamate to GABA conversion. Or if their histamine is too high, we look at why they might be producing too much of it, rather than just a histamine blocker.

And then we look at the pathways that clear histamine. There's an enzyme called diamine oxidase that degrades histamine. There's an enzyme called histamine and methyl transferase.

There's an MAOA gene. And then you can also have overproduction of histamine from mast cells or an upregulation of an enzyme called histidine decarboxylase.

So if someone just has high histamine, now you have an option rather than a histamine blocker. You can look at, are they overproducing? Are they not clearing?

How do we bring that into balance? So again, someone with high histamine, you could have 10 different protocols as to how they got there. For some people, it's overproduction.

For other people, it's inability to clear. For others, it's a combination of both. So for the doctor who really wants to dig in, get to that root cause, I believe this is where we have to start looking.

And just one other quick note, I think things are changing. One of the premises that we have is that many of the illnesses we're seeing today is related to environmental toxicity.

You know, we're living in a world that, you know, when you and I were kids, the world has changed dramatically. When I was a kid, our milk came in glass jars, not plastics, so we're inundated with plastics.

When I was a kid, I played out in the woods and slopped around in the creek, and now it's on your computer, just being exposed to EMF. Lifosate may be impacting us dramatically.

I think we're going to look back someday and say, what were we thinking giving our animals growth hormones to get them fatter faster? That's having an impact on us.

We're seeing girls maturing faster, sperm rates dropping. We're seeing autoimmune disease among children. When I was a kid, we used to call it adult onset diabetes.

Now the kids are getting it. The inflammatory bowel disease is rising among children. Mental health issues are rising. And I believe what's happening, our detox capacity is totally overwhelmed by the onslaught.

Mold is getting stronger. And I also think we're going to look back someday and say, what were we thinking putting transmitters in our ears to talk on our phones and be exposed to all that EMF?

So cumulatively it's taking a toll on us, and those who have genetic weakness are the proverbial canary in the mines. They're being hit the hardest. Same with autism.

Autism used to be relatively rare. Now what is it, 1 out of 43 or 1 out of 45, particularly the boys? And it's got to be environmental factors. And that's why I think we're going to get away from the pill for the ill because a lot of our cure of the future is going to have to be supporting the body's ability to detox all of the environmental toxins we're being exposed to.

Something dramatic is happening. But you know, I can't agree with you more. And but standard medicine isn't set up to do that. They're pill for the ill, you know, and it's like you go to this specialist, this specialist, this specialist, and they just look at their little section.

Yeah, you know, 20 years ago or grown up, no one was sick. Like every time at a cocktail party or have people

over, it's like, Hey, you know, my sister's sick or I'm sick, my parents are sick.

And, and it's like this multifunction of doctors can figure it out and all this autoimmune and chronic fatigue syndrome and chronic Lyme and. it's scary and where are we going to be in you know 20 years from now and it's interesting so I was one of the high glutamate and I didn't get the intelligence part but I got the anxiety don't sleep and just like turn everything in I'm always worrying and it's interesting so you picked that out I'm like wait a minute I was asking hey someone tell them about me you know eating you eat like crazy and it's interesting too because you can show whether or not, like you said, they're making enough or making too much or not breaking it down.

And so now instead of shotgunning all these supplements, you can be very selective. So because I tell patients, I can give you a hundred things that work, but you can't take them all.

And this allows you to be more of a smart bomb and go after these genes. I just had somebody say that I'm like a sniper, that I know exactly where to go.

I'm sure you see it as well. People come in with shopping bags full of supplements or medications. One of the interesting things is what I do is recommend nutrition for people.

But interestingly, I often say, I think I help people the most by taking them off things. Because as we get more inflamed, and we take supplements, the turn process is on.

Many times, it backfires. You know, many years ago, we learned about MTHFR. And it's a very important enzyme. It puts a methyl group on folate. And then there's another one that puts a methyl group on B12.

So the MTRR puts a methyl group on B12. MTHFR puts a methyl group on folate. And it's very important to methylate. I mean, everything we've heard about it is absolutely true.

So what people did is they get their testing done. They'd find out they have MTHFR, and it's like, oh my gosh, I've got MTHFR. I need methylfolate. And they take three to five milligrams of this.

And they might feel well for 10, 15 days, and all of a sudden, what the heck is happening? They get more anxious. They get more inflamed. And they may not even tie it to them.

So although we need methylfolate, we need to methylate. If something called NADPH is inadequate inside the body or other processes are going on, that methylfolate can actually make you worse.

So in the pyramid that I created, I put methylfolate at the top or last. Now, of course, the exception is pregnant woman. Somebody's got a massive homocysteine problem that has to be dealt with.

But other than that, I believe we are way overdosing on methylfolate. Another thing that I think we're overdosing on is glutamine. We hear about the term leaky gut.

So what do we do? Oh, well, glutamine is good for the gut. It helps build new cells. Absolutely true. But it does that by supporting mTOR, mammalian target of rapamycin, the growth of cells.

And many people have that overactive. so that when they take the glutamine they get more anxious and they get more inflamed. And the final one that we have to be careful with is many times people want to improve their blood flow or their muscles so they'll take L-arginine.

Well, if you've got difficulty with your NOS enzymes where you don't have enough BH4, you just happen to make more superoxide free radical. So some poor guy thinks he's going to improve his erectile function or muscle strength, and he ends up making himself hurt because he took a largenine.

So it's not only the right things to take, it's also the things to avoid. You know, another problem we have is bone broth. Some people think that it's this wonderful food, and it is, but it's high in glutamate and histamine.

And if you have a problem there, it'll make you worse. Yeah. And same with fermented foods. You know, there's groups that tout the benefits of fermented food.

It's good for the gut. Absolutely true. But if you don't make enough of the dinamine oxidase enzyme, it backfires on you. So it's interesting. I often say, I think I help people more by taking them off things than putting them on.

Here's an interesting clinical pearl that we're working on. We all know the benefits of B6. I mean, it does lots of things. However, it works with the histidine decarboxylase enzyme to make histamine.

## NADPH, NOX, and the Inflammation Cycle

And we're now looking at the enzymes that degrade B6. And if someone doesn't degrade their B6 and they take too much B6, they actually significantly increase their histamine levels and can make themselves worse.

And then sometimes people take supplements, they take a couple of them, they don't look at the ingredients, and all of a sudden three or four bottles have methylfolate or B6 in it, and they're overdosing.

So we have to be careful not to overdose as much as we do need to take the right things as well. Yeah. And that was my SNPs where I was taking pretty high dose of B6 for a bath cell because it's good for a bath cell.

And I had that exact same thing where I don't break it down. And so I'm making more histamine and making everything worse. So yeah. I hate when that happens.

Yeah and I'm like some's good more is better you know and and with the mthfr I can totally see that knife was kind of doing even the same thing there you know whatever methylfolate oh I got some I'll take 10 you know whatever once in a while now how does that relate to depression Well, keep in mind that there's many ways we get to depression.

But to keep in mind, to make serotonin, we need something called BH4, tetrahydrobaroptin. And that combines with your 5-HTP to make your serotonin. A lot can go wrong there.

Your BH4 also plays a role in making nitric oxide. So if we have not enough NADPH, the NOS enzymes aren't working properly, rather than making nitric oxide, we make superoxide that makes peroxanitrite that further depresses your BH4.

Most common thing we see in depression. But of course, we don't have the protocol for depression because there's many ways to get there. That's just one that I think can get there.

Or I'm tending to think that there also may be an inflammatory component where the brain's just shutting down a little bit in a self-protective mode. That has to be researched.

But the most common I see is that inflammation dampens the precursor to serotonin. All right, so you're diving deep into peptides and longevity on this podcast and we're right there with you.

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It's time to elevate your journey, starting now. And so we'll treat ALS patients and, you know, they'll come in the wheelchairs and they're out jogging and send them back to the neurologist.

The neurologist goes, oh, I'm going to misdiagnose this. And so I was trying to really use all, I pronounce it wrong on time, but you know, blocks glutamate.

And I found it doesn't work for ALS, but I found it work for depression and anxiety, which kind of makes sense, you know? Absolutely, absolutely. If you can, I'd like to talk a little bit about one of our most exciting discoveries, and that is what we call the NADPH steel.

I'm very intrigued by the NOx enzyme NADPH oxidase and the enzyme NADPH. Just very briefly, the immune system we have is totally astonishing. I mean, I'm just amazed at the complexity of the body and how it works despite what we do to it.

So when we're exposed to a pathogen of some sort, There's an enzyme called NADPH oxidase that says, there's somebody here that doesn't belong here. We've got to get rid of this.

So when we're faced with a bacteria or a virus, this enzyme will take some oxygen from iron, an electron from NADPH, and create a storm. It'll create superoxide, hydrogen peroxide, mast cells, histamine to kill the pathogen.

And if we didn't have that, well, we'd die of infection. It wouldn't work. But I believe what's happening, going back to what I said earlier, environmental toxins are overstimulating this NADPH oxidase enzyme, and we're making too many masked cells, too much superoxide.

Now, what's interesting, there's a fascinating molecule called NADPH. I love NADPH. It is what takes your oxidized glutathione back to your reduced. It helps the HMOX enzyme break down heme.

It helps you make nitric oxide and does many, many important things. Without it, we wouldn't recycle our antioxidants. But that NADPH, is used by the NOx enzyme to make all this inflammation.

So here's a molecule or an electron that recycles your antioxidants and is protective from free radicals, on the other hand is used to make free radicals.

I am just totally thrilled by that thing and I think that's what's happening to us. that environmental factors are shifting that balance. So when we were faced with a pathogen, we wanted to stop antioxidants, create an inflammatory burst to kill the pathogen, then go back to homeostasis.

I believe environmental factors are overstimulating that NOx enzyme, continuing to make inflammation and mast cells. I'm sure when you started your practice, you didn't hear much about mast cells.

Now doctors are hearing about it all the time. And those who have a genetic predisposition to the NOx enzyme being overactive or more sensitive to these environmental factors are the ones being impacted by this.

That's why I call it the NADPH steel, where this very important NADPH is being used to make more inflammation than it should rather than recycle antioxidants.

Additionally, we look in the software, there's genetic mutations where you may not make enough NADPH. If you combine that with it, you've got a real problem.

What we generally find is that when people are really ill, they can't get answers to their questions. They're usually overproducing free radicals by fendant reaction or nason coupling or the excess glutamate or interleukin-6 being upregulated.

And then something wrong, they're not making enough antioxidants or enough NADPH. or the NADPH is being used excessively in that NADPH steel. And then finally, we've coined the phrase the home cycle.

It's a term we came up with based upon a relative of mine that I admired. And it's where this inflammation then feeds the red and angiotensin system creates more NADPH and we just have one cycle of inflammation.

And I believe that's what's happening to a lot of people, that the inflammation can't be stopped. They might get Lyme disease and their doctor tells them, okay, your Lyme is over, but they're still sick as can be.

They get some other inflammatory condition that just keeps going. So I think the challenge we're seeing today is that environmental factors are up-regulating the NOx enzyme and primarily by over-stimulation of interleukin-6.

If anyone would like to listen to it, I did a one-hour, 50-minute interview with Dr. Jill Carnahan. It's on her YouTube channel. Just go to YouTube, subscribe to Dr.

Jill Carnahan. And actually, I have like five or six videos there. But the one on interleukin-6, I think the doctors will really appreciate, because we look at all the environmental factors combined with genetic weakness that's leading to up-regulation of interleukin-6.

I'm seeing that in so many of the most ill people we do. And when we do console… That seems to be the key cytokine that just sets everything off. And just to backtrack a little bit, so, you know, you talk about NADPH, how does giving NAD affect NADPH.

I guess as long as you can recycle it. Yeah, that's a good question. And again, that's gotten a lot of attention. Some very well-known people are talking about the benefits of NAD, and everything you've heard is true.

It feeds the PARP enzyme, which repairs your DNA. It makes your NADH, which is at the top of your electron transport for energy, and makes your NADPH.

It stimulates the sirt joins that are your longevity enzymes that balances m-toronatophagy. So you tend to think, Well, the more NID I take, the better off I am.

And I talked to a lot of folks who do NID therapy, and I'll say, for some people, is this the best thing they've ever done? It's like, yeah, that's great.

And I say, for other people, was it a horrible experience? And it's like, yeah. So I think what's happening is that, and this is just Bob Miller hypothesis, okay.

But I think what's happening when the NOx enzyme is upregulated, and you start boosting NADPH, you've just given more fuel to the fire to make more inflammation.

So what I've been recommending people do is first calm down NOx. Find out what are the factors that are overstimulating NADPH oxidase, calm that down, then give it AD and watch what happens.

Then it works. It seems like the NOx enzyme, which I hadn't heard about since I spoke to you, seems to be central to all this stuff. Yes, and interestingly, a paper just came out in December that said that anyone who had upregulation of NOx seemed to be more susceptible to more serious COVID.

And that's kind of the path we've been going down, because the cytokine storm is interleukin 6, and also bradykinin is a piece of this as well. But we've been talking about upregulation of the NOx enzyme, NiL6, and the cytokine storm.

But even if you set COVID aside, I believe many of the things that we're seeing today are related to this IL-6 being overstimulated. Again, I encourage people to listen to my one-hour, 50-minute interview with Dr.

Jill Carnahan. We go through slides. We don't make things up. We look at all the peer-reviewed studies and show how this upregulated interleukin-6 is behind so many of the conditions we're seeing today.

So I'm seeing a very unique client base. Many times people will come to me after nothing else is working. 80% of the people I talk to have upregulated interleukin 6 by other environmental factors or genetic factors.

And mold is becoming a real problem. Mold will stimulate interleukin 6. it's believed that the lipopolysaccharides in Lyme is what's stimulating the interleukin-6.

Radon will stimulate it. Overexercise and then internally histamine, homocysteine, dopamine, sulfites all stimulate interleukin-6. So the beauty of the software is rather than guessing you can actually look and see and we actually have interactive maps where the doctor can look and see where there's a genetic predisposition.

And with that precision, you can say, oh, I think it's the sulfites. Oh, I think it's the dopamine. Calm those down. Knox calms down. Then you can put in your NADPH.

Keep in mind, we need NADPH to recycle glutathione. So here's another example. We learn all about the benefits of glutathione, the master antioxidant.

The lower it goes, the sooner you die from all causes. So we tend to think, let's take glutathione. And many times, you hear people that say, you know, I felt good for five days, then I felt worse.

And they don't understand why. Well, if you take glutathione, in its reduced form, then it does its job through glutathione conjugation or by glutathione peroxidase to remove hydrogen peroxide, it goes into the oxidized form.

And if you don't have enough NADPH to take it from oxidized to reduced, that oxidized glutathione ironically combines with oxygen and superoxide to make peroxanitrite an oxidizing agent that makes you more inflamed and depletes your glutathione.

So who to thunk taking glutathione under the wrong conditions can make you more inflamed and deplete your glutathione. So that's why you have to make sure that the glutathione s-reductase enzyme is working.

Here's an interesting clinical pearl that we're just researching. Again, it's patterns that go together. I'm sure most of the doctors listening to this have heard of NERF2, a nuclear transaction factor.

That's controlled by KEEP1, and NERF2 controls GSR, glutathione s-reductase, that takes the oxidized glutathione back to the reduced.

## EMF, Calcium Channels, and Software Tools

I'm observing that people that just have been everywhere and can't get any answers, they've got mutations on KEEP1 that makes it stronger, NERF2 that makes it weaker, and mutations include a thioness reductase.

And some well-meaning person says, let me give you a cysteine, they get worse. They say, well, let me give you glutathione. They get worse and they don't know why.

So what you have to do is you have to make sure that Nrf2 is strong enough. You give the cofactors to help GSR. Matter of fact, we're just formulating a product now called GSR assist that I think is going to be incredible.

It actually has things that stimulate the GSR as well as the cofactors, trying to use riboflavin to make FAD. Then when you give glutathione, it'll work.

And that's the kind of personalized care I believe we need. We just can't throw glutathione at a person because they're inflamed. Yeah. Cause you see these doctors and like they give glutathione to a hundred people, whatever couple go, Oh my gosh, I feel worse.

Like what? Never seen that before. And they have no idea. And just since we're on the peptide summit, just, uh, you know, BPC TB four KBV lower interleukin six, but nitric oxide can be a double edged sword, right?

Absolutely. Yes. Of course, if you Google nitric oxide Nobel Prize, you'll see the Nobel Prize, I can't remember if it was the late 80s or early 90s, won a Nobel Prize, three scientists, for the importance of nitric oxide.

We think of it as the dilator. Men need it for rectal function. We need it for cardiovascular. But it's also very anti-inflammatory. It actually calms down mast cells.

and has an anti-inflammatory role. However, I think nitric oxide has gotten somewhat of a bad rap because sometimes people look at nitric oxide as pro-inflammatory.

Well, what happens is that nitric oxide will combine with superoxide to make peroxynitrite. Bob Miller opinion, okay, just my hypothesis, that the problem is that we're making too much superoxide.

and if we don't have enough superoxide dismutase to neutralize it, that superoxide combines with nitric oxide to make that dangerous peroxynitride. One of the potential causes of that could be EMF.

There are now published reports that show that EMF stimulates superoxide. Yeah, I'm telling you, I've done a deep dive and the more you read about EMFs, the scarier it is.

Absolutely. Again, if somebody goes to Dr. Jill Carnahan's website, we just did an hour 20 minute video on EMF where again we went through the published literature.

We just didn't make things up somebody had on a blog and the published literature is there that it stimulates free radicals and inhibits your glutathione, SOD and catalase.

And it's there, but no one wants to talk about it. It's like they deny it. It's like so much of medicine is just like, you know, just suppression of information.

Well, look how long it took to admit that cigarettes was a problem. You know, back in the 1940s, if you want to be entertained or disgusted, go on YouTube and type in 1940s cigarette commercials where you see doctors in their white coats recommending Campbell cigarettes.

It's good for your throat. Hey, I remember even in residency, like doing anesthesia, the anesthesiologist would be smoking the cigarette in the OR, you know.

Yeah. Well, we didn't know. We didn't know. And there was denial for a long time because, you know, you could smoke a cigarette for 10 years and you were okay.

Smoke for 20 years, lung cancer and emphysema. And I'm afraid we may see the same thing with EMF. Now, the cool thing about our software is we've identified the calcium voltage channels and we can actually identify those people that might be more prone to EMF sensitivity.

we look at what are called the CaCNA1C genes that are the calcium voltage channel gates. And just as the gate implies, it pushes calcium in by voltage.

And when you've got mutations, you're more prone for that EMF from outside sources to push calcium in as chalmodium. That then combines with nitric oxide and superoxide to make peroxynitrite.

And I've spoken to many people who had to move out, you know, in the middle of nowhere, the wooden log cabin and not have any EMF exposure because it makes them ill.

And we've just done that. And we just did a five webinar series. If one of the doctors is interested, just contact us. We'll give you the links to the videos.

We just did five webinars. on how EMF will create Fenton reaction, interleukin 6, through the calcium voilase channels, and then more importantly, how to identify that and then what to do about it.

Where would we find those? Well, at the end here, we'll just go to our website, functionalgenomicanalysis.com, and that's our website, and you can go inside and you'll find our contact information there.

So what you may want to do is contact Yvonne Lucchese, and I'll give you her email address, Yvonne, Y-V-O-N-N-E, and then the letter L at DNAsupplementation.com, Yvonne L at DNAsupplementation.com, and just ask her for

the link for the five webinars, and they're free.

Somebody can watch my five webinars on EMF. Again, we're doing more EMF lectures. I just keep adding and adding to them. And we're finding BPC helps stabilize those calcium channel, voltage-gated calcium channels.

But yeah, it's crazy stuff. So your software is, I think, really one of the keys, and you're even upgrading it, and allows doctors to understand all this.

Absolutely. Now, this is a lot to learn. So, one of the things we're doing is we have online certification courses for the doctors to train them, and then we also are creating software, dynamic messages in the software that will actually give doctors messages on what to do.

Here's the website functionalgenomicanalysis.com. If you want the webinars, yvonel at dnasupplementation.com and just ask her for the webinars and we'll be glad to send them at no charge.

And while we're doing a screen share here, we didn't plan on this, but why don't I just very quickly bring over this is our inflammation map that we create.

I love that stuff. Yeah. So here's the entire map, what it looks like, that maps out how you can make inflammation inside the body. And then you can zoom in.

And if anyone would like this map, again, we send it to you free of charge. Just ask us for it. Here's what I was talking about earlier. The NOX enzyme, NADPH, is used by the NOX enzyme to make the superoxide, hydrogen peroxide, mast cells, and histamine, but it's also needed by the NOS enzyme to make nitric oxide, thriodoxin, glutathione, put the iron from heme into ferritin, and there's this battle here, the NADPH deal.

And then as I spoke earlier, we talked about interleukin-6. I believe that many environmental factors are just overstimulating interleukin-6, which then creates a cascade of superoxide, peroxynitrite, mast cells, histamine, they all come back and stimulate IL-6 even more.

Thanks for joining us on the peptides in the longevity podcast. If you enjoyed today's episode, don't forget to subscribe, share, and leave a review. It helps us reach more listeners' passion about optimizing their health.

For more insights, resources, and updates, visit our website at www.ncbi.gov. which will allow Brady Kynan to go up and A. M. G. attention to go up just to relate to interdictants.

Doug, this is something we need to look at. Interesting.