

A sunburst graphic with numerous thin, light gray lines radiating from a central point behind the text.

Healthy Moms Podcast

BY **Wellness Mama**[®]
simple answers for healthier families

Episode 172: How to Understand Your Genes to
Personalize Your Diet With Nutrition Genome

Child: Welcome to my Mommy's podcast.

This episode is brought to you by Four Sigmatic. My kitchen is always stocked with their coffee mushroom blends, their Matcha mix, and their straight mushroom drinks. Four Sigmatic has figured out how to get the benefits of mushrooms like chaga, lions mane, cordyceps and reishi into delicious instant drinks. My current favorite is their adaptogen coffee blend that has torsi and astragalus. But I love all of their products. They have options with or without caffeine so if you're not a caffeine person you can find products that you will love. And I find that even their coffee blends that do contain caffeine have less than a normal cup of coffee. But don't let this fool you. I have found that I get so much more focus and mental clarity from these mushroom blends than I do from regular coffee, and without the jitters. The addition of the mushrooms, which are considered nootropics, meaning that they are good for the brain makes these super food blends more effective and much healthier than just regular old coffee. I love them with a dash of macadamia milk personally. I also love that many of their drink mixes are instant and packaged into individual servings so they are perfect for travel or on the go. If you're listening to this, then you can get a special offer just for listeners of this podcast by going to wellnessmama.com/go/four-sigmatic.

This podcast is also brought to you by Good Culture. Good Culture makes amazing cottage cheese. I know, I know, not necessarily two words you would put in the same sentence on everyday speaking. But theirs is awesome, I promise, even if you don't love cottage cheese. Basically, it's naturally fermented cottage cheese so it's free of gums, fillers, and additives and it's packed with probiotics. And because it's made naturally it doesn't have that weird mouth feel that a lot of cottage cheese has. So, I use it all the time in cooking and smoothies as a substitute for other types of cheese, or just a meal on the go. You can find it at Whole Foods and many other grocery stores and it comes in yogurt-sized cups too, and those are perfect for meals. Check them out. It's Good Culture and they are available at many grocery stores.

Katie: Hello and welcome to, "The Healthy Moms Podcast." I'm Katie from wellnessmama.com. And this episode is going to be fascinating, especially if you've ever wondered about your genes and what they actually mean for your health and for your life because I am here with Alex Swanson, who is the founder of Nutrition Genome and the creator of the software Genetration, which I hope I'm pronouncing right. He's a second-generation nutritionist and co-owner of the Swanson Health Center, which is a private family clinical nutrition practice that's been in business for over 40 years. He's also the creator of the popular blog, The Health Beat.

And he is a wealth of knowledge probably the most knowledgeable person I've ever spoken to on this topic. And I'll make sure to mention this again at the end of the episode. But Alex has generously offered a discount to anyone listening on the nutrition genome testing. You can save 10% with the code, [wellnessmama](https://wellnessmama.com), by going to wellnessmama.com/go/nutrition-genome. So we'll repeat that at the end. It'll be in the show notes. But, Alex, welcome and thanks for being here.

Alex: Thank you so much for having me.

Katie: I think this is gonna be an amazing episode. And I can't wait for everyone to listen in because I could literally talk to you all day about this, and we've actually gotten to talk before when I ran my genes, and my husband's, and all of our children, and you kind of helped me understand all the different genetic components and what we were looking at basically. And your company also provides, I'll say this at the beginning, a 50 plus

page report that explains all that in detail. But I wanna get into some of the specifics on different genes and what they mean or don't mean today because I know this is an area of a lot of confusion. There's a lot of information out there. And if you just get your genes tested and then start from scratch, it can seem very overwhelming. So to start with actually, I'd love to hear a little bit of your story and how did you get into this in the first place into genetic testing, because it's definitely not like an easy field to just jump into. How did you get here?

Alex: Well, I had a clinical nutrition practice for a little over ten years. And about five years ago, that was when the gene MTHFR kind of started to come in the consciousness of practitioners and the public, and people wanted to know what their genotype was for it. And so I kind of started looking into it a little bit more during that time, but it really caught my attention actually when my wife came to me with some questions regarding this horrible pharmaceutical drug reaction she had a few years back. And it was really scary because it's actually life-threatening. And nobody really gave her an explanation as to what happened or why. And she really wanted to know because she was afraid, "Could this happen again. Why did it happen?" So I started doing a lot of research at that time on genetics and trying to figure out, you know, basically the pathways that were involved with these drugs, and what could have essentially gone wrong.

And that led me down this huge just, you know, rabbit hole of research of piling together a huge database of all the genes that I could find, all the research I could find, drawing out all of these biochemical pathways, and finally arriving at an answer and being able to figure it out, and understand this on a level I never did before. And I realized that this was such an incredible tool for a clinical practice because you could start getting answers to things that didn't really make sense. And that's when I started using it more and more in practice and with clients. And over the years, it became the nutrition genome report, which was the software, and the database, and everything from the published research findings to my clinical findings as well.

Katie: Super fascinating. And I'm glad that you started with MTHFR because that's definitely probably one of the most well-known genetic problems that people have heard about now. I know there's a lot of information out there, but for anyone who maybe isn't as familiar with it, can you kind of just give a brief overview and then like what that can actually tell us about what's going on in our body?

Alex: Sure. So MTHFR has to do with folate metabolism and the folate cycle. And the reason it started getting so much attention is we started seeing that people have a wide degree of folate requirements. And some people do...can break down synthetic folic acid, which is different from folate. And some people do not break it down well, and they do much better with methylfolate or folinic acid, which is fully found in food. And this is a really important point because there are actually multiple genes involved in the folate cycle. There's one called DHFR and then MTHFD1, and then there's MTHFR. So they all kind of go in order at the folate cycle. And DHFR is what breaks down folic acid into the folate cycle.

Now, when you have variants in that gene, it can actually disrupt that process, and it can bottleneck. And when it bottlenecks, it puts all this unmetabolized folic acid in the blood stream, and then it actually inhibits MTHFR. And that can be really problematic. So problematic that there was a study that came out recently from Johns Hopkins University that found that very high circulating folic acid levels in low-income communities doubled the risk of autism. B12 levels that were very high, unmetabolized in the blood tripled the risk of autism. And if both levels were high, the risk increased to 17.6 times. So when you look at folic acid supplementation or fortified foods with folic acid, that can be a really big problem. And I think it's something that really hasn't been talked about enough.

Katie: I agree. And that's one of the things...I don't know if many people realize that is the problem with modern grains because I mean, there's a lot of obviously controversial information out there about whether we should consume grains at all, and which ones, and gluten-free versus not. But one of the points of that is that for most of history, people were grinding up grains and then using them right away. They were fresh ground and they were ground much more coarsely than they are now. But when they're ground fresh, they have more natural, from what I believe, natural folate. They don't have the inhibitors and they are just more bioavailable versus the highly processed ones we have now that don't have that. So they actually add in folic acid from what I've read. Is that your understanding as well?

Alex: That's correct, yeah.

Katie: Yeah. And so then, that's a much bigger source than we would have ever gotten on a traditional diet even if it included grains. And I think that's an important point to keep in mind. It seems like from my research, the MTHFR is especially important during pregnancy because it can affect pregnancy. But I know a lot of the moms listening are either pregnant or would like to become pregnant at some point. So I'd love if we could kind of start at the beginning there. And talk about one of the most important factors that we need to understand about our genetics during pregnancy. And like if you get a genetic test, what can you look at to see what you need to do?

Alex: Sure. So the two most important nutrients I would say, if you're gonna point out two, would be folate and choline. And the reason is, is that they play a major role in turning genes on and off. So this is a process called methylation. And methylation affects brain function and mood, fertility, immunity, preventing miscarriage, detoxification, hormones, and just overall DNA health. And something I also wanted to mention regarding folate and MTHFR is there's a lot of fear that kind of surrounds MTHFR, like, you have people say, "Oh, I have the, you know, MTHFR mutation. I have the homozygous variant," and there...I don't think that fear really needs to exist because when you start to look at genes in general and how we started to get these different variants based on our environment, our diet, our stress, our migration routes, there's a reason we have these.

And with MTHFR, that essentially means that you have an increased need for riboflavin, which is B2 to stabilize it, and methylfolate, which is basically bypassing that enzyme because it's slowed down. So you have this increased need. And based on the research that I've done and how other genes have changed, it's likely due to having a high intake over a period of time of folate, a methylfolate that slowed that enzyme down because you were getting enough dietarily. And therefore, your body kind of adapted to that so it could put energy elsewhere. And when you start to look at where the highest frequencies are of the homozygous MTHFR genotype, it's actually in Mexico, Southern Italy, Spain, and France, all warmer climates where there's more folate foods available. So I think removing that fear is a really important point with MTHFR in general. But folate intake can vary. And I think that's why it's really important to get that test to see all of those genes, how well do you break down everything in the folate cycle, or the, you know, the methylation cycle. And that's where also choline comes in.

And choline is unbelievably important. I think it's becoming more and more the focus now with pregnancy and realizing that we've been depriving people of choline. Choline's highest in egg yolks, it's highest in organ meats, it's highest in wild meat, it's highest in the thigh meat versus the breast. And so people that have been told to eat egg whites, the chicken breast, avoid organ meats, all of this kind of this dogma that's been

persisting over the last few decades we're starving people of choline. And choline is essentially in that methylation cycle as well. I think it's 60% of the methylation relies on choline, and women require much more. A lot of times, you'll see much more variance with women. It's connected to estrogen. And for pregnancy, the amounts go up tremendously. I mean, the third trimester, you have very high needs for choline, and that's extremely important for the brain health for the baby.

Katie: That's fascinating. And I think it's a great example of why we can't just look at one gene in isolation like MTHFR and be like, "Oh, I just need to take methylfolate and then I'll be fine," because there's so many things that work together for that to happen. And that's really interesting about the pregnancy, and the choline, and that increased need, because I know from reading and research a lot of traditional cultures, when a woman was pregnant, they fed her an incredibly nutrient-dense diet that included lots of organ meats, and egg yolks, and green foods, and all those things you just mentioned. So that's super fascinating that I feel like there was probably traditional wisdom that cultures have had for years. And we're finally getting around to the research side of understanding why it was so beneficial.

Alex: Yeah, I agree.

Katie: So another gene that definitely comes up a lot when people are talking about genes and risk factors is the BRCA genes, which I know those are typically tied for women who have a history of breast or ovarian cancer in their family. Obviously, those are very scary to people who are told that they have that. Is there anything that we can do to strengthen these genes or to avoid the problems? I know you say and you're writing a lot that your genes are not your destiny, they're just a blueprint. And I feel like maybe this is one great place to use as an example because it can seem very scary certainly to someone who finds out they had that. But what should... How can someone look at their genetic possibility of that?

Alex: Yeah. So the BRCA, also known as BRCA genes, BRCA1 and BRCA2, so these are tumor suppresser genes. They're typically tested by doctors to help determine breast and ovarian cancer risk that runs in families, and the type of cancer is typically estrogen negative. There is a lot of fear again surrounding these genes. And I think it's also because they're kind of put out in isolation without any explanation as to what are they, how do they work, what is causing damage to them, how can we make them stronger? And that's kind of our whole approach, is saying, "Okay, these are the genes. This is what they do. How do they interact with all these other genes? And how do we strengthen the whole?" And so for BRCA, because they're connected to DNA repair, we have to think, what is causing DNA damage that the BRCA genes are struggling to keep up with.

And so the answer there is actually dioxins. And dioxins are these really toxic compounds in our environment. They're the byproducts of herbicide production, the chlorine bleaching process at paper companies, the combustion of fossil fuels, and the burning of industrial waste. And what's really interesting about this is that dioxin concentrations were not really significant until the 1920s. That's when it started with the chemical industry. And dioxins accumulate. So they make their way up the food chain into the fat of animals, which gets passed on to us. So 90% of our exposure to dioxins actually come from animal fat. And that's based on their animal feed, and if that pasture that they're grazing is contaminated with dioxins.

And they did research actually looking at different types of dairy, whether it's cow, goat, sheep. And depending on the location, it varied quite a bit. Some had very high amounts of dioxins. The most potent one is called TCDD. And that's the one that research has found really harms the BRCA genes. It actually epigenetically silences them, which stimulates these DNA strand breaks. So I would say that dairy would be

something that most people, if they have done this testing, they have breast and ovarian cancer in their family may want to think twice about, or be really careful about your source. But what's really helpful to know is that they actually looked at...the researchers looked at TCDD and resveratrol. And resveratrol actually was able to reduce the induced DNA strand breaks that actually protected the BRCA genes. And they realized that it actually could support the BRCA gene by increasing resveratrol on the diet, so that would be red wine, peanuts, pistachios, blueberries, bilberries, cranberries, cacao, and muscadine grapes.

And so that was really one, we're like, "Okay, here's something we can do. Resveratrol increase, decrease dairy." Another one would be that the researchers found that if they consume...these women consumed up to 27 different fruits and vegetables a week, they saw their cancer risk diminished by 73%. So this variety of plant foods within diet seems really important for that DNA repair. Again, choline comes up, the PEMT gene, which is connected to choline. They found that a low choline intake was associated with more frequent BRCA1 promoter methylations, which means you had an increased cancer risk. So that choline intake becomes important for stabilizing the BRCA genes as well.

Katie: That's super fascinating, and so illustrative of how...like, exactly what you say in your writing so often that our genes are not our destiny. And that because...from what you're saying there are now scientific studies that show that our environment and our food supply do, in fact, directly impact our genes and whether they are expressed or not. Is that right?

Alex: That's right, exactly.

Katie: That's super fascinating. I know another gene that comes up a lot, and my parents I think are researching quite a bit right now is the ApoE, because there's a tie to an increased risk of Alzheimer's disease. And as I think people hit their 60s and 70s, that's an important one that they wanna know about. Does the same thing apply here? Are there strategies that help people who have the ApoE that reduce the risk of Alzheimer's?

Alex: Absolutely, yeah. ApoE is another fascinating gene. And again, yeah, a lot of fear attached to these genes. And I think there are a lot of genes we need to look at when it comes to Alzheimer's because with ApoE, you know, people who have the, what's called the E4/E4 genotype, which is considered the highest risk genotype. Not everybody who has that genotype gets Alzheimer's. And not everyone who has Alzheimer's has that genotype. You know, there's a lot more to it. But I think this does give a good clue as to what we need to do to be proactive and to put in these prevention techniques that are effective. So ApoE is what's called a cholesterol transporter. It helps remove toxins, and it essentially helps maintain the health of the brain neurons. And the thing with ApoE is it's actually a tradeoff gene, it's kind of fascinating.

So the E4/E4 genotype is considered the hunter, gatherer genotype before agriculture. So agriculture came in and that's when we started seeing these twos and threes. That's the hypothesis anyway. And so what they found was that ApoE, the E4/E4 is actually beneficial in many ways. It can prevent miscarriage, stillbirth, infectious diseases, it increases early cognitive ability, and it increases vitamin D and calcium absorption for stronger bones. And then the tradeoff is that there's a reduced ability to repair injuries to the brain. So this really made sense during that time period for a species to select ApoE4 because early life survival was a big threat. We could talk about on Alzheimer's, so I'll try to kinda keep this part brief.

But if you look at the research on what's proven to be beneficial for Alzheimer's, you see shades of the hunter,

gatherer diet, longer fasting times, routine dinner and breakfast, a little grain and sugar, a little to no dairy, emphasis on protein and fiber for a healthy blood sugar. Blood sugar has a really strong connection to ApoE, and inflammation. And because there is a reduced ability to repair, you wanna be very careful of high contact sports, or, you know, anything that's gonna increase your risk of concussions because that increases your risk of Alzheimer's especially if you have a delayed repair.

For women, we see that two-thirds of Alzheimer's patients are women. So there's obviously a hormone connection here. And researchers have found that when they have women who remove their ovaries by age 40, and they don't do hormone replacement therapy, they double the risk of Alzheimer's disease. So we see a connection with the estrogen. So the things that I think of is that with ApoE4 E4 for women, it's really important to really lower stress levels in general. Anything that's gonna be causing inflammation is gonna be a problem. But stress in general will basically rob your hormones. It will deplete pregnenolone, which is that precursor hormone to estrogen and progesterone. So pregnenolone is actually neuroprotective and it boosts memory. So we show a connection there.

The second one again is PEMT for choline. Choline has a very strong connection to memory, and it's stimulated by estrogen. And there are drugs called anticholinergic drugs. These are your nighttime pain relievers, antihistamines, sleep aids, antidepressants, they all block acetylcholine production. And they've all been found to increase the risk of cognitive decline. So I think the PEMT gene along with estrogen levels are two major factors for cognitive decline.

Katie: Well, and as a mom listening to this, I'm thinking, so people who have that ApoE4 E4 what you said, they have a higher risk of...or they are not as quick to recover from a concussion or a brain injury. So even for a mom who we're not as worried with our kids and Alzheimer's at this time in their life, that would be something. And one of the reasons I was looking at getting the kids tested is I wanna know that before they're playing contact sports or things like that because obviously, children can occasionally get concussions or especially if they're in more high-risk sports, but that seems like that would be really good to know early in life so we can make sure we're protecting our children's brains from the earliest days. Does that make sense? Is that what you're saying?

Alex: Yeah, absolutely. And again, there's another thing that I found to be extremely beneficial for this genotype is there's a connection with the SIRT1 gene, which is essentially an anti-aging protein. And in Alzheimer's, there are these amyloid plaques that can build up on the nerves, and they can become toxic if they don't get cleared out. And so ApoE4 has this reduced clearance of the beta amyloid plaque. But if you stimulate that SIRT1 gene, the SIRT1 gene can help clear out those plaques. And so you see foods again that are similar to the ones we talked about with resveratrol, but it's polyphenol consumption becomes extremely important for this genotype. So that's, you know, your strawberries, your apples, grapes, wine, peppers, berries, pistachios, cacao. All of those are extremely beneficial foods for this genotype.

Katie: Got it. Good to know. And I know when I talked to you before about my own genes and my husband's, we went through some specific ones and you kind of explained what they meant and what that means as far as what you should eat or not eat because of it. So I'd love to kind of go through those and have you elaborate. One that you mentioned was a gene related to caffeine metabolism. And I don't think many people, you know, realize that's something that's genetically...at least, we have a genetic predisposition to in some way. So can you explain what that gene is and then what it means depending on if you have it or don't have it?

Alex: Sure. So the gene that's connected to caffeine metabolism is CYP1A2, and that means that you're either a fast metabolizer or a slow metabolizer. So the fast metabolizers essentially clear out caffeine quicker. And the slow metabolizers, it can stay around longer. So the people who are slow metabolizers, it may cause more of an issue from a cardiovascular standpoint because your body's not clearing out caffeine. Now, to add another layer to that, is with people who have that sensitivity to caffeine in terms of increase in anxiety or, you know, your stress hormones in general, it just kinda makes you irritable, that has to do with a connection gene basically that's called COMT. And COMT is what breaks down catecholamines, catechols. So those are high in coffee, they're high in tea, and wine, and that can slow that down and increase that adrenaline response. So I always look at a combination of CYP1A2 and COMT to see how really does this person do with caffeine in general, and how much will they tolerate. So with the people who are slow metabolizers, those are really the ones that are of concern in terms of it causing more issues from a cardiovascular standpoint.

Katie: That's good to know. Okay. So that's what basically someone could look at their own report and see which of those they have, and then kind of know if it's a good idea. Are there any genes, like, would you say in either of those that's completely contraindicated to consume caffeine or just you wanna be aware of that and use moderation?

Alex: Yeah, it's mainly moderation. In the research, what you see is really when you start going over two cups, that's when the change is really kinda, you know, split up in terms of what you're seeing from a physiological standpoint. But there are also people who just can't tolerate it at all, caffeine in general. I'm actually one of those people. I've never done well with caffeine. And based on my genetic blueprint that I look at, it makes complete sense because it puts me, and my dopamine, and my adrenaline into overdrive. And so there's more than a few genes you can look at to kind of figure that out.

Katie: Interesting. So that's a perfect segue. You mentioned neurotransmitters and dopamine. Are there other genes that directly kind of impact the neurotransmitters or that give you a clue of what's going on with your neurotransmitters in your body?

Alex: Yeah. The mental health section, the neurotransmitter section, that's the part I started using the most when I was doing my clinical practice. It was so unbelievable for understanding anxiety, and depression, and, you know, neurodegenerative disorders in general. So there are a few that have to do with glutamate and GABA. So there's a gene called GAD1, there's a gene called BDNF. Both of those have to do with glutamate levels. And so, glutamate is this essentially excitatory neurotransmitter when your brain is moving pretty quickly. And then GABA is this one that kind of slows it down and calms you down. And caffeine works by actually inhibiting GABA and pushes your glutamate up.

And the problem with glutamate is that, you know, in the right amounts, it's great for cognitive function, but when it's too high, it causes damage. And so you see this kind of branch of disorders of neurodegenerative disorders when you look at whether it's Alzheimer's, or dementia, or epilepsy, or MS, all of these have this glutamate excitatory excess component to it. And so you can kind of see your glutamate metabolism or your GABA metabolism and how to how to balance those, if that's where the issues are coming from. You can look at dopamine and adrenaline, and think, "Okay, how is this linked to ADHD," or, "How is it linked to maybe anger," or even, you know, trouble concentrating, and really see those levels from a base understanding. The same with serotonin. And so there's all of these ways to help balance all the neurotransmitters together. And the information we have in the analysis really goes through one by one, how those genes are working, what you're more prone to, and basically how to balance them. And so I had a lot of success with it for anxiety and

depression.

Katie: That's awesome. And I will say from the report that you guys run, I've done actually several different gene tests over the years. And the one you guys do blew me out of the water because you don't leave all this up to interpretation. You actually send this 50-page report that includes the nutrition stuff of, like, what to actually do, like, what does it mean, what do I need to do, what blood tests do I even need to look at if there's gonna be maybe a potential for other problems that could be more serious. And that was super helpful to me as a mom because I ran...my husband and I both ran the tests and then all of our kids, and I just kind of like lined up the ones that were supposed to be the best for all of us, and we just kind of based our meal plan around that. But I think that's a great thing.

And I wanna just mention that for moms who are listening because it can seem overwhelming when you're hearing all these genes, and these abbreviations, and trying to really understand and remember. But if you get the report, it goes into all of that in detail and so it kind of gives you guidance on if it says this is something you wanna watch for, or this would be a good food to help support your body. And I think you guys do an awesome job about that. What about genes related to athletic performance?

Alex: Yeah, the athletic performance. So we have genes that are connected to VO2 max to begin with. So that gene actually looks at your inherent ability from an aerobic standpoint. So there's actually a pretty wide variation for people. And it starts to make sense, you know, why are people...some people so much better at long distance and so much, you know, some people are so much better at just kind of short sprints. And it kind of tells you where you are, but also that you can manipulate that. You can increase your VO2 max not only through aerobic exercise, but, you know, there's actually certain adaptogens in herbs that help increase your VO2 max. Cold exposure actually can help increase your VO2 max. So it can kind of help you fine-tune that and figure out, okay, if you wanna become more of an endurance athlete, what steps do you need to take to get better at it. It also looks at inflammation markers.

So for people who, you know, have longer recovery times versus people who have shorter recovery times, it helps you see that as well. And look at those genes and think, "Okay. I have a slower recovery," or, "I'm more likely to have a delayed response here in terms of rebuilding muscle. What do I need to do here to increase that?" It shows collagen production. So if you're more prone to certain injuries, how to increase collagen production, and why you might have a higher need for these precursors as well to prevent injuries. Something I wish I knew a long time ago having a lot of injuries myself, it all made sense all of a sudden. So it really does kind of guide you into fine tuning your ability. Whatever it is you wanna do, I don't...you know, whether you're an endurance athlete or you're, you know, a powerlifting athlete. It can help you essentially fine-tune that.

Katie: Got it. And so another thing that's super popular right now is the keto diet and fasting. And I didn't realize until we first spoke that there were actually genes that kind of indicate that you might do better or worse with these because I, as a thyroid patient, as a woman, that's one of those, like, you often hear the advice, don't fast, it's really bad for your hormones, it can mess up your thyroid. And I experimented with water fasting under the guidance of a doctor. And I did awesome with it. I felt amazing. I continue to feel great after my labs did well. And when we were going through my genes, you kind of explained how that made sense based on my genes. And that I had genes that made me a pretty good candidate for fasting. But can you explain what those genes are and how they affect your body's ability to fast or not?

Alex: Sure, yeah. So we have a whole section in the digestion section of the report that goes through protein,

fat, carbohydrate, fiber, the metabolism, essentially all of those. And the most we have are actually on fat metabolism because there's a huge variation for people on that. You know, some people do well on high fat, some people who don't, or it's the different types of fats that are important. But for fasting, there's a gene called PPAR-alpha. And this gene...actually, the variance in that are not as common. But when they do show up, it can actually tell you that, you know, you may not do well in these fasting states. And the reason is, is you actually have a decreased amount of ketone bodies.

And so the low ketone bodies is not, you know, what you're going for when you're in the fasting state. You're trying to get those ketone bodies up. And so with people with that variance in that gene, they actually have a higher sensitivity saturated fat as well. So if you were doing this high saturated fat diet, and you're fasting quite a bit, and you had a really poor response to it, this could help explain why. Now, for that gene, again, there's always an answer. And so for people with this gene, you want to focus on foods that are called agonists, so foods that actually really benefit the stimulation of this gene.

And so it's actually what they found was that there was a polyunsaturated fats, so Omega-3s, fish nuts, and seeds, astaxanthin from wild salmon, pterostilbene, so from blueberries, raw almonds, cinnamon, and tomatoes. All these foods help activate that gene and they could work better, because the other side of it is it's actually a tumor suppressor. And has the ability to inhibit tumor growth when you activate it. And so for people who are trying to get those benefits from fasting, it may be better actually to be...you know, have a smaller window, but to include these agonists to stimulate that gene.

Katie: That's so cool. And I think that's a great point that you keep highlighting and so important to remember is, like, all of these genes, it's easy to look at them and think like, "Oh, mutations are a bad thing," or, "This gene is a bad thing." But every one of these, you've said, you know, that actually is protective here or it has this purpose and to, like, to look at that whole approach and realize that our body does has these genes for a reason and they support each other, and that they don't just work in isolation. I think that's a key part of your message. And I love that you educate so well about that.

Alex: Okay. Yeah, I think it's something that's been missing and the understanding of how everything's working together.

This episode is brought to you by Four Sigmatic. My kitchen is always stocked with their coffee mushroom blends, their Matcha mix, and their straight mushroom drinks. Four Sigmatic has figured out how to get the benefits of mushrooms like chaga, lions mane, cordyceps and reishi into delicious instant drinks. My current favorite is their adaptogen coffee blend that has torsi and astragalus. But I love all of their products. They have options with or without caffeine so if you're not a caffeine person you can find products that you will love. And I find that even their coffee blends that do contain caffeine have less than a normal cup of coffee. But don't let this fool you. I have found that I get so much more focus and mental clarity from these mushroom blends than I do from regular coffee, and without the jitters. The addition of the mushrooms, which are considered nootropics, meaning that they are good for the brain makes these super food blends more effective and much healthier than just regular old coffee. I love them with a dash of macadamia milk personally. I also love that many of their drink mixes are instant and packaged into individual servings so they are perfect for travel or on the go. If you're listening to this, then you can get a special offer just for listeners of this podcast by going to wellnessmama.com/go/four-sigmatic.

This podcast is also brought to you by Good Culture. Good Culture makes amazing cottage cheese. I know, I know, not necessarily two words you would put in the same sentence on everyday speaking. But theirs is awesome, I promise, even if you don't love cottage cheese. Basically, it's naturally fermented cottage cheese so it's free of gums, fillers, and additives and it's packed with probiotics. And because it's made naturally it doesn't have that weird mouth feel that a lot of cottage cheese has. So, I use it all the time in cooking and smoothies as a substitute for other types of cheese, or just a meal on the go. You can find it at Whole Foods and many other grocery stores and it comes in yogurt-sized cups too, and those are perfect for meals. Check them out. It's Good Culture and they are available at many grocery stores.

Katie: I'd also like to go deep on the genes related to vitamin D because this is one that shows up in our family and amongst our kids even. And it's one I've researched quite a bit. But from my understanding there are genes that impact our body's ability to create and use vitamin D. Can you explain that?

Alex: Sure. So there are genes that have to do with circulating vitamin D levels. So there's a gene that shows you if you're more likely to have lower vitamin D levels in general. And then there's another gene that looks at the vitamin D receptor, which is called VDR. And VDR is...essentially requires these cofactors to help you absorb vitamin D. And that's the one that's really been researched quite a bit, are the VDR genes. And so that would be... When you start to look at vitamin D in isolation, you start to see, like, well, there's all these cofactors it needs for absorption. And if you have variants in these VDR genes, they become even more important.

So whether that's magnesium, or that's boron, you know, or it's, you know, different minerals that are required for that vitamin A, actually there's a connection there with D, that becomes more important for the absorption of it. But it also may, you know, tell you that you need to be in a sunnier climate. If you know if you have traditionally much lower vitamin D levels, that sun becomes more important. And we start to see that with the serotonin genes as well for people who really get more depressed in colder or darker climates, you know, that they need more of that sun in their daily life.

Katie: It's good to know. And so I'd love if you could also kind of go through because you mentioned in passing like the mental health section, and the metabolism section, and the different parts of the report. But I was shocked, I was literally shocked when I got it and so how much information was there. So can you kind of walk us through, like, what's on a given report? And, like, if someone does the testing with you guys, what they're gonna get?

Alex: Sure. So the report is broken into eight sections of health. And we kind of go through the genes. We separate them out into each section. And the section would be...so there's digestion, there's methylation, hormones, neurotransmitters and mental health, antioxidant protection, detoxification, DNA repair, and then cardiovascular, and exercise performance. And what I tell people is, "Think of this as a book on you. If you were to buy a book on yourself, and everything you'd want to know from a health standpoint. And take it in small amounts at a time. You know, it is 50 pages but, you know, a book could be 2 to 300 pages. And the information you're getting, you're always gonna go back to it, and you're always gonna find things out, and you're always gonna keep learning."

And what we're doing is...what we're working on is that we're here to help people throughout their life. So we're continually updating genes, updating research, and our new dashboard will come out in June, will

automatically update people's reports. They'll have that option to do so. So you can always kind of be learning, getting small amounts at a time, and have that base understanding because when you start to look at your family history, so going back to, you know, to your grandparents, and your parents, aunts, and uncles, and then your personal health history, you can start to see patterns sometimes. And when you recognize those patterns and you start reading your report, you're gonna see yourself in this. And that's when it starts connecting. And that's when you start making these really great strides towards your health to know, "Okay, this is what's been running in my family for this reason, and here are the genes. And here's what I need to do. And here's how I can prevent it." And that's when it becomes really empowering. That's when you remove fear of things that we've been told for a while that, "Oh, it's genetic. You can't really do much about that." And we know that's not true now.

And so what I recommend people doing is just take a little bit at a time as you start to read through it because there's so much great information in there, and it's easy to miss some things, or get overwhelmed. But that, we also put that all in the beginning for you, in the first few pages to make it easy. So we have an actual strengths and weaknesses table, so your genetic strengths and your genetic weaknesses. And in one-liners, we say, "Here's how you turn your weaknesses into strengths." We have a customized grocery list that has been formulated by multiple genes throughout the whole report together to create that list, and then recommend a blood work. That saying, you know, this won't be out of range, but it may be of interest based on your results. So you could even just spend the first, you know, few pages and have a great idea of the main things you need to focus on, and then go into the research later.

Katie: Yeah, that's super cool. I'm curious if there are any kind of universal things that impact gene expression that show up over and over across lots of people's reports or that are just, for instance, things like the dioxins that are now in our environment that nobody really needs to be exposed to. Are you seeing any patterns there?

Alex: Patterns in terms of universal sensitivities?

Katie: Yeah, either universal sensitivities that seem to be showing up a lot in today's society, or things that can either positively or negatively affect genes, kind of, across all types.

Alex: Yeah. So I think in this...probably this one seems obvious, but sugar comes up. It's pretty universal as a problem. And that has to do with the nitric oxide genes for a lot of people. Sugar with inflammation, it's something we've known for a while and it definitely shows up consistently. Something that I think a lot of people will benefit from...I mean, chronic stress is essentially at the top of that negative genetic expression pyramid. And we all get affected in a very similar way by it. We just have different manifestations of it based on our biochemistry, whether it goes...we get migraines, or headaches, or we get heart issues, or we get, you know, stomach issues if that's where it changes. But I think that all these things to mitigate chronic stress is something that we all universally need.

Our environment, you know, that's actually something that changes. We all thrive actually in different environments based on where we've come from. And I think that's a really interesting area to me because of how different climates affect different people. So that's something I'm getting more into or why some people do really well with cold therapy, other people would rather avoid cold showers the rest of their life than do one. And some people love heat, love saunas. And some people, like, "I can't stand it." And I think those little variations are really interesting from an environmental standpoint. But I think, yeah, I mean, chronic stress

and sugar seems to be pretty, pretty much everybody.

Katie: Yeah, probably pretty good universal advice. I'm curious if there are other things specifically that can damage genes or negatively affect them that we are encountering in the environment, or even a more controversial one, you're welcome to dodge this one if you want, but things like vaccines, there's now so many more in our environment and...I mean, in this schedule that they give to children. And I know those have like an immune component. Obviously, they're affecting the immune system. But is there any evidence that they are or could have a problem against genes as well?

Alex: So, yeah, my feeling on this or my thinking on this is that, we have an environment now that is...it's more polluted and more toxic than I think we've ever had to deal with. And the issues with, like, heavy metals, you know, in general, we're seeing this really the surge in heavy metal issues. And as I've talked to a lot of practitioners, you know, who are running these tests and they're seeing like, "Look how high this is. Look at this, like, the cadmium is off the chart." It's becoming a big problem. And there are variations in genes that have higher sensitivities to heavy metals. MTHFR 1298 is one of those genes that is connected to BH4, which is really important for neurotransmitters health, so brain health. And it can really deplete BH4. So there are gonna be people who have a hard time with aluminum, a hard time with mercury. They're gonna really be affected negatively more than other people for that.

And so I think that there is something to say for that when we're starting to look at toxicity, because glutathione, which is essentially our endogenous antioxidant system, that's what's connected to longevity. So when you look at glutathione levels, people who live the longest have the highest glutathione. And what depletes glutathione? Chemicals, toxins. And so with these glutathione genes, that's something else I think we need to think of with children as well as how well are those working, how well are they able to deal with that toxic load and detoxify it. I think it's a question we all need to be asking.

Katie: So are there things we can do specifically to support the gene? I know I've written a lot about the environmental side in our homes and trying to remove some of those inputs that we're constantly bombarded with. But are there things like internally, like, either food or a supplement base that support the body and also that process?

Alex: Yes. So glutathione, some of the best things you can do to increase it would be bone broth, for example, because the precursor amino acids would be in bone broth. That'd be a great way is actually a really great choice of those amino acids. Selenium and vitamin C, those will all really help boost glutathione quite a bit.

Katie: Good to know. I'll put those in the show notes as well, I'm making notes on all of this as you speak. As you're saying this, I'm, like, hearing connections to, like, a lot of these medicinal type mushrooms that are really popular right now. And I've seen some emerging research on different ones like cordyceps, and chaga, and lion's mane having like a neuroprotective or a genetic protective benefit, and being able to kind of support the body in unique ways. And you have a background in nutrition as well. Have you seen any of this? And what are your thoughts on those types of mushrooms?

Alex: Yeah. I've heard a lot of people call me the mushroom man for that reason. I have a huge interest in medicinal mushrooms because the research is so vast on what they can do. And it's so unbelievable. And I think they're an answer to a lot of things we're having to deal with today. Lion's mane is one that comes up a lot in the nutrition genome report because of its ability to protect the nerves, its ability to increase memory. It

basically stimulates nerve growth factor, which is pretty rare for something to be able to do that. Reishi and cordyceps protect the mitochondria, protect your cells. They have a lot of anti-aging components to them. Chaga is another one that has a lot of really strong anticancer research. All the medicinal mushrooms have anticancer research. So when we're seeing so much cancer and we know the connections between toxicity and cancer, medicinal mushrooms really do provide this extra defense that I think is helping us adapt to this world that we're all living in. So I think it's something that it's sustainable and many people are gonna benefit from.

Katie: Got it. And so I'm making notes here in the show notes as well as we talk, but it seems like...so from what you've said, there's some universal principle, like, we all probably need to get enough sleep, and reduce our stress levels, and get some sunshine. With your background in nutrition as well, are there any dietary principles other than avoiding sugar that seem like pretty universal recommendations, like, green vegetables, the phytonutrients. I'm curious if you have a starting point for anyone listening of just, like, a general nutrition recommendation.

Alex: Yes. Well, to begin with, I think, again, we take it from such an individual standpoint that I think certain foods are superfoods for one person. And they may not be for another person. And so when I think of...when I see these, you know, lists of superfoods, in my mind, I'm thinking, "Well, it depends. What does that person really need? What are their top five," you know? And so I think that's really the way I look at it. I mean, whole foods in general, vegetables in general, and fruits, and nuts, and seeds, and the type of eggs you get, and the type of meat, all of that is really important. But I think what we're starting to find is that we kind of need to narrow down, like, what are these personal superfoods for people that are really important that they get? What is their ancestral history telling us that they really need? One that it makes me think of are omega-3.

So we think of omega-3s as this kind of universal, it's good for everyone, everyone needs to be taking fish oil capsules, that kind of thing. But really, there's actually a pretty...there's a variation of where the dose is healthy. And so for some people, they have genes that convert plant-based omegas pretty well into EPA and DHA, and then there's others who don't. And that has to do with migration patterns whether they had more of a plant-based diet, or they had more of an animal-based diet. We know that the Inuit in Greenland that they essentially have a deleted allele for this FADS1, FADS2 gene. And that they have adapted to a diet of strictly animal-based omega-3s without any plant. They can't even make a conversion with plants. So my answer would be the universal approach is definitely a whole foods diet. I think that's obvious to a lot of people, less packaged food, less sugar. But also know what your body thrives on, and because everybody's really different in that sense.

Katie: Yeah, that's so true. And like I said, I love that you are doing what...I haven't seen anyone do before, which is really bridge that gap between what our genes are and what that actually means for our day to day life, and especially for like what we eat, and for what's in our environment. Also, I'd love to just talk through the process a little bit more about the test because for anyone who hasn't done this, I definitely would encourage it. And like I said, you guys have the best one that I've seen. And it was fascinating to see all of our kids, and what they got from each of us, and what their genes looked like. But also, I think yours is the easiest just as far as the testing procedure because it's a cheek swab versus having...like, I know several of them, I've had to spit into a pretty big cup. And there was no way I was gonna get my two-year-old to do that. So can you explain, like, just kind of walk people through the testing process? What it looks like? How long it takes to get results? And then what they can do from there?

Alex: Sure. Yeah. So we do a DNA kit. It's sent to your home. And it's a cheek swab. And it takes, you know, just a few minutes. And you basically put that in this vial. And we have a prepaid envelope that you just send back to our lab. It just takes about three to four days to get to the lab. And then it is five weeks from the day the lab receives that sample. And you'll be notified of that. And then at five weeks, you'll get a notification by email saying your results are ready. And you sign into your personal dashboard, and you'll get the 50-page nutrition genome report on you. And you get your own DNA data text file as well.

And you'll have that option to also be if you wanna continually have it automatically updated. Every time we release a new gene, or new research, it can just be uploaded and you get a notification that it's ready. And you can continually check in. We also have a list of practitioners that we recommend on nutritiongenome.com. We're gonna have a lot more starting in June and July as we release an exam that they have been trained in the tests. And so if you need to go a little deeper, or you need to, you know, talk to your practitioner, or you wanna get blood work, all of those things, there's that option as well.

Katie: And I wanna make sure I ask you because I get so many questions on this on my site about the privacy. Like, do you guys protect...how do you protect the privacy of that genetic data, I know there were some concerns with some other tests. I don't wanna name names, but just as far as if that data was being protected, and I know that's obviously a concern especially for a lot of moms. So how do you guys handle that?

Alex: Yeah. It was really important to us that privacy was number one, because we didn't want people to feel uncomfortable taking the test, or thinking that their data was being shared to third-parties, or sold to third-parties. So we do not sell the data. The data is stored but it can be deleted. And the only reason we store the data is so that we can keep you up-to-date when there are new files that come out for the new genes. We actually keep that on file so that you can get updated. But we can delete that from our system. And it's not shared with anybody. It's essentially lock and key. We have it on a HIPAA server protected so that it doesn't go anywhere.

Katie: Wonderful. And just a reminder, the link to...if you guys wanna check it out and find out more, it's wellnessmama.com/go/nutrition-genome. That link will also be at wellnessmama.fm in the show notes, and make sure to use the code [wellnessmama](http://wellnessmama.com), all one word, to get 10% off. And, Alex, thank you for offering that discount. I know I hear from a lot of moms who want to have this data, and who have either with privacy concerns, or the budgetary concerns, and you've addressed both of those. I really appreciate that and I appreciate you sharing your expertise. Like I said, I literally could talk to you all day about this. And if we get a ton of questions, we might have to do a round two one day if you're up for it.

Alex: Absolutely, yeah. Thank you so much for having me.

Katie: Any time. Thank you so much for your time. And thanks to all of you for listening. And I hope to see you next time on, "The Healthy Moms Podcast."

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