

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 136: How to Unzip Your Genes to
Understand Your Health with Dr. Jennifer Stagg

Child: Welcome to my Mommy's podcast.

This podcast is brought to you by Vivos. This is something we recently invested in for our entire family and we are absolutely loving it and here is why. So, data shows that the nutrition we receive in utero determines our palate development and how narrow or open our airway and jaw structure are. So a narrow mouth, jaw and airway increase the chances of needing braces, of getting sleep apnea, breathing difficulties and much more. But it was pretty much assumed that your jaw structure was set in stone once you were born or for sure after the first couple of years of life. But Vivos has found that not only is this not true, but they created a non-invasive, non-surgical, easy way of widening the maxilla, the jaw and the airway. So for our kids, this means that they get to avoid the braces that my husband and I both had and for my husband, this means his sleep apnea has disappeared and he stopped snoring, which is a bonus for me. I'll be writing more about this soon but you can check them out, in the meantime, at wellnessmama.com/go/vivos

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Katie: Hi, and welcome to "The Healthy Moms Podcast." I'm Katie from wellnessmama.com. And I'm here today with Dr. Jennifer Stagg, who is the author of "Unzip Your Genes." She's a practicing naturopathic physician, and is the founder and medical director of Whole Health Wellness Center in Connecticut. She is a sought after speaker, a medical contributor. She's appeared on a lot of news networks. And I'm excited to have her here today, because I get a lot of questions about genetic testing. My audience, you guys are pretty great about knowing, understanding the basics of genes, and even epigenetics. And I want to dive a little deeper today. Well, Dr. Stagg, welcome and thanks for being here.

Jennifer: Thanks, Katie. Thanks for having me.

Katie: So, like I said, my audience has a pretty decent, at least basic understanding, kind of, of genetic testing, and that it exists. But, I'd love to make sure, in case anybody doesn't have that understanding, let's start there. So, what is genetic testing? And kind of with what the technology we have right now, what kind of testing are we able to do?

Jennifer: Sure, so, a lot of people are familiar with genetic testing if they ever had to do some sort of preconception planning, in terms of family counseling. So, that's kind of the way we've viewed genetic testing for many years. And then, even more prominent would be people who've had testing for BRCA genes, for risk of breast cancer. So, then we are talking about diseases. But, what has really come into the kind of mainstream press, is wellness genomics. And a lot of that is probably due to the online, direct to consumer platforms, like 23andMe, ancestry.com. And, you know, I think that that's fantastic. But, you know, it takes some interpretation to figure out what to do with that, how to utilize that properly. And then certainly there are a lot of panels that integrative providers have been using for many years to help us better understand and kind of give some clues about what direction to go with patients. But now what we have is more so, wellness profiles. So, that's really what I wrote my book about, is, this concept of using your genes as... I just attended a conference this week in Seattle, the Personalized Lifestyle Medicine Institute. If anyone is familiar with Dr. Jeff Bland. He had a great quote. He said, and I actually wrote it down, because I thought it was so great. "Genes

don't tell us who we are, but who we might be." So, I thought that that was, you know, really right on line with where genetic testing is going.

Katie: Yeah, I so much agree. And it's amazing to me, because I even remember, I'm going to date myself here, but being in high school and, like they had just sequenced the human genome. And this was all kind of an emerging field. And in what seems like at least to me a relatively short amount of time, we've now gotten to the point where we can do a version of this at at-home testing, which is incredible. And it's really good. But, I think, the thing that you said about, kind of the raw data that comes, especially with 23andMe, is such a good point. Because, when I first did genetic testing, I got this raw data, that, if you aren't a trained geneticist makes absolutely no sense, unless it's interpreted. And I know there's a lot of different resources out there for interpreting it. And, they can sometimes disagree. And there can be some misinformation. So, I'd love to go a little bit more on this. So, what kind of testing is this? I'm assuming that things like 23andMe are not like a full sequencing of the human genome. But just, a testing, is it a testing of most common genes? Or what are they testing?

Jennifer: Yeah, so with 23andMe, they actually are looking at the full complex of SNPs, so, single nucleotide polymorphisms. So, you actually have access to all of that data. But when the interpretation, which last spring, changed back to what they could do before, where they actually had more broad level interpretation and even looking at risk of various disease states on there. So, that information is available. What comes on the 23andMe is a small amount of information relative to everything you've actually been tested for. So then, what happens, is a practitioner, or even, you know, a layperson, has access to some of these interpretation software programs. So now you can plop your 23andMe data into one of those interpretation platforms, and get more information. So, I mean, as a physician, if someone has done 23andMe, I will use some of that data, and use interpretation software to look at things, like detoxification potential, methylation pathways. And that's really looking more so for people who actually have disease states, or symptomatology, conditions that we are trying to have some sort of guidance around.

But what is really cool is the ability to do these genomic wellness panels. So in this instance, you are basically paying for a test where you are getting interpretation of, you know, 50 to 70 different genes. But, they are selected for genes that are actually what we call actionable. So, in the type that I talk about in my book, the wellness panel that I primarily use for, you know, this paradigm shift of, like, what can we do to use genes as your greatest opportunity, I guess to say. And so with that information, now we are looking at things like: What type of exercise is right for you? What is the ideal diet for you, in terms of your macronutrient content? And then even, you know, what your behavior is around food. Nutrient deficiency risk. And then you do have to follow up some of those tests with actual blood tests to look at what we call metabolic outcomes with, you know, your actual vitamin D level, for example.

Katie: Yeah, that makes sense. And this is so exciting to me, to have watched this kind of evolve over the last decade. Just because, like for years we've known, from just basic studies, the benefits of certain nutrients, or certain lifestyle interventions. But they never took into account the personalized aspect. So, like magnesium is helpful for a lot of people. And a lot of people use Epsom salt. But, there are certain genes where people have issues with sulfur. So magnesium sulfate, like Epsom salt wouldn't be good for them. And now we actually have the ability to kind of look deeper like this. So I love that you started talking about the kind of things we can find out from that. Because, certainly no one tries to just do a genetic test, is that they have a list of these SNPs and scientific terms. Like, that would not be beneficial to people. So, let's go a little deeper on that. What can we find out from this kind of testing? Are we able to extrapolate like what foods are probably better or worse for us? Or what nutrients we might need more or less of? What kind of data are you pulling?

Jennifer: Yep. So, with the panel that I use, first of all, we can figure out your matching diet type. So, this isn't...we're not to the point of saying, on genetic testing, with these types of panels, they haven't been developed yet where I could say, like, "You should eat broccoli instead of squash," for example. So, it's not like that. Right now, the data that you can get is your macronutrient balance. So that would be carbohydrate, fat, and protein ratios. So, this is very helpful, because you may be someone who does better with the

Mediterranean style diet. So, when I did my testing, I'm Mediterranean. So, that means 35% fat. But, it could turn out that you genetically match better to a low fat diet, then we are talking about 20% fat, which, there is a big difference there. And we know from this information, that first of all, when you are on a genetically appropriate diet, if weight is an issue and you are looking to lose weight, you are going to lose two and a half times more weight on that genetic matching diet. But second, what we call a secondary outcome, is that you get better cholesterol control. So, if cholesterol is an issue, we actually saw on this study, that people who did the genetic matching diet had a better LDL level, LDL cholesterol. So, what that says, is maybe...so if you matched up to a low fat diet, and you are eating a Paleo diet, and your cholesterol is an issue then we...you know, and, I've seen this in my practice plenty of times, that we would swap them into a low fat diet. And, we really do see better cholesterol control. So, this is the whole issue here, which you highlighted, is that, it really comes down to personalized medicine for many aspects. Certainly, obviously, smoking is bad. We can make a blanket statement about that. But, we can't really make blanket statements in a lot of areas with nutrigenomics. So, a low fat diet may really be right for you, and you could figure that out from genetic testing.

Katie: That makes perfect sense. And I know like there is some emerging research that is not out there yet. And I don't think it's fully available to the consumer. But, I know they are testing being able to look at like RNA output from the gut, and match that with genetic testing to see how they match up, and what is actually being expressed. Which leads me to my next question, which is, let's talk about epigenetics. So, genes are super important. And I think you have a good way of explaining this, from your book. But I think people kind of sometimes worry that their genes are their destiny. And if like their, you know, mom got breast cancer, and their grandmother got breast cancer, and they have the gene for breast cancer, that they are going to get breast cancer. But even in those situations, there is people with the genes who don't. And that's where epigenetics comes in. So, let's talk about that. First of all, can you explain what epigenetics means?

Jennifer: Yeah. So, epigenetics, that term basically, there is what we call your genomes, so that's kind of your DNA code. And then the epigenome is, what we kind of say, is above your code. So, your DNA code is basically a series of letters. The epigenome is what we describe as marks on your DNA. So this is where, you know, I'm sure your listeners have heard plenty probably about methylation. And so there are these methylation pathways. But, when we are talking about epigenetics, the genome can get methylated in areas. And what that does is, it can mostly turns on genes, but it also could turn them off. So here is the epigenetic potential. When you have these marks on your genes, and methylation is only one of them. There is also, you know, things like histone modification. There are a lot of technical terms. But essentially, these are kind of chemical marks that go on your DNA, which affect the expression of your genes. And so, this is how, for example you can have...this is probably my favorite example, is that you can have diabetes in your family. And you can actually get tested and determined you have some of these specific genes that put you at a higher risk of diabetes. So, yes, you know, you have to watch what you are doing, in terms of your diet. But what we can tell even more specifically, is that, for patients who have certain genes that predispose them to diabetes, if they eat a Mediterranean diet, so this all comes down to genetic testing, and if they have these specific genes, they can actually completely negate that risk. So this is where, you know, you could say, "Oh my....diabetes is in my family. There's nothing I can do about it." Well, actually that's not true. So you could actually eat a Mediterranean diet, if you have these specific genes, and you have the same risk as the rest of the population.

Katie: That's really cool, and I think probably going to bring a lot of hope for a lot of people. And like I said, my audience is, a lot of them are pretty well-versed in this. And I got some specific questions related to different types of mutations. So, if you don't mind, I'd love to go like just a little bit deeper and just kind of analyze some of those. And, you mentioned methylation. So, that would kind of be the first one I'd love to delve into. So, just kind of a brief overview on what like a MTHFR mutation or a methylation-based mutation is. And, like, what that might mean from a health perspective.

Jennifer: Yep. So, there are a number of different... So, for example, from 23andMe, you can actually pull out a whole methylation report. So you can look at the various vitamins, these cofactors that are used in what are enzymatic reactions, to provide what are called methyl donors. And these methyl donors is exactly what I was talking about. Those are key to impacting how your genes get expressed. So, the most famous one, obviously,

is the MTHFR. And that's, you know, a lot of people call it a mutation. And it technically isn't. It's a SNP. So, it's a single nucleotide polymorphism. So, it's a variant of the allele. And, for people who have an MTHFR or SNP, first of all, they could either have one or two copies of it. If they have two copies, it affects the enzyme even more so. And then there are actually various different types of MTHFR mutations. So there is not just one. It does matter. You kind of have to look at it and look, is it the 1298. Is it 677? So then the solution, you know, trying to keep this simplified, the solution, what happens here is that you're not converting, you know, folate to methyl folate. So, basically people would take an active folate, an activated form of folate that already has the methyl group on there, but what...and so, you just take this methylated folate, and you think, "Okay, I have fixed all my problems." And for some people, you know, I've found this to be really effective for people who have suffered from lifelong depression, or anxiety. This really does play quite a bit into mood disorders. But, also crosses over into many other conditions. But, what we find, for people who practice this a lot and even people who have tried this on their own, that sometimes that doesn't correct it. And for some people, it can actually make it worse. So, this is where you have to look at all the other things going on. So then you are looking at things like the COMT SNPs, so the C-O-M-T, and whether they need support there, MTRR. So, it does kind of spiral and get really complex. So there is really...you know, there is an art to that.

Katie: Yeah, for sure. And another one that I know came up on mine and even my husbands, and I get questions about is like the VDR...I don't know if they're actually specific mutations, but the VDR issues. So can you talk about those as well?

Jennifer: Yep. So the issue there is that, sometimes we have to do Vitamin D testing, that we are looking at 1,25-hydroxy, or 25-hydroxy. But, I have that as well. And so during my...I have three kids. So then, during my second pregnancy, I actually did...the first one, I didn't do any Vitamin D testing, because that was 13 years ago. The second one, I was really adamant about doing Vitamin D testing. And I needed a lot of Vitamin D. This is when I realized that just, you know, my levels were quite low. And I hadn't had genetic testing at that point. And then once I had the genetic testing done, I realized, "Okay, well, this is where this comes from." And then in terms of supplementation, I just have to take higher doses. And so, in clinical practice, we find that some people can get by, and their levels, as long as we are testing them with the right tests, their levels seem to be falling in optimal range. But for other people, they may need to be taking 5,000, 10,000 units a day. It can be really difficult to get their Vitamin D levels up.

Katie: Definitely. I've noticed that for both of us, because we do test Vitamin D pretty frequently. And for me, I could take all the Vitamin D supplementally that I wanted. But, if I don't get some sun exposure as well, it just really seems to not...I don't seem to assimilate it very well. So I think that's really valuable data for a lot of people to know that. And just to be aware of it. Because, I mean, how many conditions are related to Vitamin D deficiency? And we know that. There's the research there. And so, I think it's really helpful to be able to look at that on a personalized level. Another one that I'd love to go deeper on, if you have any knowledge on this, is the MAO-A, or the MAOA. So, that's another one that showed up for both of us. And, I'm curious because I've seen some conflicting research on that. So I'm curious if you have seen anything on that, or if you've ever dealt with people who have that one as well.

Jennifer: Yeah. So I don't do as much work there, if I do a...sometimes I'll do a panel for people who have more complex mood disorder issues. And when I've looked at the research there, it seems to be really limited about what to do about those, MOA-A and B. Those are tricky to deal with. So, I don't have a ton of experience with those. And it doesn't seem like a lot of people really do. So we are kind of guessing there, as opposed to some of the other SNPs.

Katie: That makes sense. And so, when we are talking also, to circle back on detox pathways and methylation. A lot of the research I've seen is that there are some easy lifestyle interventions. And you may be able to just talk about some general lifestyle interventions that seem to kind of help across the board with detox pathways. And I know things like leafy greens are one that is often brought up, especially for methylation. But, have you seen any kind of commonalities across the board, things that tend to help for people with those kind of specific issues?

Jennifer: Yes. So when it comes to detox, there are a lot of things that you can find out from the detoxification panel. So you could find out, for example, like there is a CYP1B1, I think I'm saying that correctly. There is so many of them, to try to keep them straight. That one, actually can raise your risk of having breast cancer. So it impacts how your estrogen gets metabolized. So you have these kind of negative estrogen metabolites for hydroxyestradiol. And so you are basically impacting the conversion pathways where you go through phase one and phase two detoxification. So, for example, when you do genetic testing there, if you found out that you had that particular issue, then we could specifically target, and give someone a DIM supplement, for example. And that can be really key there. So, using genetic testing when it comes to detoxification is another way we can personalize it even further. Because, yes, we know that, you know, certain...we can make broad statements about detoxification. But for some people, it's more of an issue of imbalance with phase one and phase two. And then we can even find like people who have...so if you've had toxicity screens and found, for example, that you had arsenic as one of the toxicants on your panel, then you start going and looking, well, where am I getting exposed to arsenic? And of course, we've all heard about arsenic in rice. And rice is a bioconcentrator of arsenic. And then chicken. So you hear about these sources of arsenic. But then why do some people come up that their arsenic levels are not high, and other people do, and they seemingly eat, you know, pretty similar diet. Well, it turns out that there is also a SNP for arsenic, that could impair your ability to clear it. So now we start to get...you know, go back to kind of like the roots of naturopathic medicine. Yes, you have a group of people with the same exposures. But, genetics is at play, and it could impact your ability to clear it. So, someone else doesn't get sick. But one person does. And it does come down to genes there.

Katie: That's a great explanation. Thank you. And in your book, so you kind of walk people through a whole program on basically how to do the best we can to ensure that our genes are going to express in a healthy way. So like we mentioned earlier, our genes are not necessarily our destiny and it's whether they're turned on or off, so can you take us through your work on that, and what you've found to kind of...things we can do proactively, to help make sure our genes are going to express in a healthy way?

Jennifer: So, you know, a lot of what we talked about is in that category that we call nutrigenomics. So we are looking at diet. But, then we have to think more holistically. Because, diet is not the entire piece of the equation. So I often, you know, when I talk about this, I have patients that come in. They are seemingly doing everything right. They are eating a great diet. They are exercising. But, what the elephant in the room is, is, how are they dealing with stress? And we know that stress impacts epigenetic expression. So, what happens there is that, when you are under stress, either, you know, acute stress, or low grade chronic stress, cortisol is released. And cortisol affects those methylation patterns along the epigenomes, so how your DNA gets tagged. And so, it is so important to be dealing with stress in whatever way works for you, whether that's meditation, if it's prayer, practicing a positive mental attitude. Sleep is also critical. So, we are just going back to the basics, you know, the foundations of health. And as a naturopath, that's what we always talk about. We are not only focused in one area. We look big picture. And we try to...you know, we get to know our patients. We have in-depth discussions about what's going on in their family life. They have a mother who's sick. Like all of this stuff matters. It's not just diet alone. Although diet is really important, this is, you know, really 60% of the equation. So we say probably 30% is genes. 60% is behavior, diet, you know, lifestyle. And 10% I guess at this point is healthcare, access to healthcare, in terms of what really is your determinants of health. The other thing that is really key, that I think a lot of people don't talk about so much, is connection and community. So, we know that having this kind of sense of purpose in your life, which is also connection with the world around you, does actually impact your health outcomes. And this also comes back to what's happening with gene expression.

Katie: I'm so glad you brought that up, because this is something I've researched a lot lately, and just had conversations with people about. Because, if you look at the last even just 30 to 40 years, but especially the last 100 years, there has been a drastic change in community and how it works in our world. Because, it used to be, like my grandmother's generation, they grew up close to family. Like you had built-in community all the time. And, we've largely moved away from that in today's world. And if anything, our community has shifted to an online version, which they are still studying. But it seems like the data is pretty clear that an online relationship and, you know, a Facebook friendship does not affect your health in the same way, of course as

an in-person friendship and spending time with someone. So, I love that you brought this up. And I'd love to go a little bit deeper on more of exactly how community affects our health. But also, do you have any suggestions for kind of trying to create that? Because I feel like in today's world you really have to make an effort, because we've all just kind of moved away from that so much.

Jennifer: Yeah, absolutely. So, I kind of talk about that, there's a couple of different ways that I see that certainly playing out in clinical practice. So, you know, you see people who just identify themselves by...you know, that have...so think about someone who is approaching retirement, and they have defined themselves by what their career has been. Or even, like a mom. So, I'm a mom. And, you know, and that's a large part of how I define myself. But when your kids move out. I see this. So I have moms who have been through this, and their kids move out, and their friends are working outside the house. I say that in air quotes, they're "working outside the house." Friends say, you know, "Well, what are you going to do with your life now." And they are often really...they can be really stuck. And it can create such turmoil for them.

So, the first thing I would say is, start to think about what really makes you happy. And it doesn't have to be that you have to develop some elaborate nonprofit. I'm going to do this. You know, start to think about what really makes you happy. And so, I have a 65-year-old woman in my practice. And the discussion, we talked about, well, what were some of the things that you used to do. And she used to participate in her kids' plays, and she would help with costumes. One of her children was very theatrical. So she really helped in that area. And so we ended up figuring out, okay, you are going to get...she started getting involved in local community theater. So really, again, this is kind of a personalized thing. But she felt like she was giving back to her community. And feeling like she is filled up inside, and has some sense of purpose. So, again, when I say personalized, it's going to vary. So what creates sense of purpose for one person will vary from another. But also thinking about your day of like, how am I connecting. And another place where we go, you know, we are doing poorly, I would say, and I am guilty of this, in families, is not spending enough quality time together as a family. Like that whole process of sitting down to dinner together, you know, is part of feeling connected to your community, which can be your family. Having friends over, you know. All of these interactions, just like our body is interconnectedness of interactions between, I'll bring up your microbiome and your human genes. Also, we see that playing out with our greater Earth community.

Katie: I love that. That is such a good point about, you don't necessarily have to just look in your neighborhood, how someone found that in their local community theater. I think that is a great thing. And I think, such a good encouragement, especially to moms. Because we, if anyone, they say like, in today's world, motherhood can be kind of a lonely thing sometimes, because you are so busy with the children and everything else involved in running a household, that it can be hard to make community. But I love that. It doesn't have to be that difficult. And even just those little connections can make such a big difference. And we know that. It's crazy. You don't have to have the research to realize that, because it is instinctive to us. But I think it's a good reminder. And I love that you talk about that in your book and that you bring that up. Because, I think that needs to be said more and more.

This podcast is brought to you by Vivos. This is something we recently invested in for our entire family and we are absolutely loving it and here is why. So, data shows that the nutrition we receive in utero determines our palate development and how narrow or open our airway and jaw structure are. So a narrow mouth, jaw and airway increase the chances of needing braces, of getting sleep apnea, breathing difficulties and much more. But it was pretty much assumed that your jaw structure was set in stone once you were born or for sure after the first couple of years of life. But Vivos has found that not only is this not true, but they created a non-invasive, non-surgical, easy way of widening the maxilla, the jaw and the airway. So for our kids, this means that they get to avoid the braces that my husband and I both had and for my husband, this means his sleep apnea has disappeared and he stopped snoring, which is a bonus for me. I'll be writing more about this soon but you can check them out, in the meantime, at wellnessmama.com/go/vivos

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Katie: And also, I love that you brought up motherhood. Because, to me, all the new genetic data is both kind of a warning and an encouragement to moms. So we know that there is a lot of...like what you do during pregnancy can, for instance, have an impact on the baby's future health. And so, if you are pregnant, or thinking about getting pregnant, understanding these things can really help you kind of optimize your pregnancy. But, I also found it was an encouragement because, since our genes are not our destiny, those of us who kind of learned as we went, and maybe had children, or some of our children before we figured this out, it's not that they are set in stone, that they aren't going to have a good life. But, like can you talk about that specifically? Maybe a mom who is considering pregnancy, and is in that preconception planning phase, things that you can do at that stage to also help improve your child's genetic future.

Jennifer: Yeah. So, yes. So, this is a really important area of research. And actually, there are some colleagues of mine who have a family practice. So they have family practice and also deliver babies. And they actually did a whole outcome study, looking at the effect of nutrition and outcomes for small and large gestational birth babies, for pre-term birth. And they looked in their clinical practice at what they are doing. And of course, in their practice, they are practicing functional medicine. They are, you know, defining specific, personalized diets for the mother-to-be. And when they showed their data, people were almost crying in the room. So, this is a group of physicians that were so taken aback by their data. They essentially had, compared to the general population of the United States, they essentially had no pre-term births, no small for gestational age, or large for gestational age babies, in their practice, just because they really focused on nutrition, and even used nutrigenomics to their advantage. So it was amazing to see that.

The other thing we know is that, yes, like preconception does matter. So, your health before you even get pregnant impacts the genome for the baby. And what a lot of people don't talk about is, you know, there is so much focus on mom, there is actually a lot of issue that we see with dad. And so, sperm, the DNA in sperm is more variable to environmental influences, because there is continued production, versus like our eggs are basically our eggs at birth. And, with the mom, you're just more talking about the kind of the metabolic environment. But for DNA, it really does matter. So I was actually interviewed for "The New York Post" on this, about the trend, and is it just, you know, being trendy, of mom and dad doing something like a detox, or cleaning up their diet and their environment before they actually attempt to conceive. And is there any validation for that? And, of course, yes, the data is there. It really is important what you do preconception. But, to your point, yes, if you happen to get pregnant, and it was unexpected. And you hadn't had the chance to be in an elaborate program, a preconception program, we do know that it matters what you do during pregnancy. And it does matter even after the baby is born. There are critical time frames. So, those early developmental years for the baby are also critical. And it matters what you feed them. It matters how much stress they are perceiving. So, you know, there are all of these time points, that again, we see this dynamic between environment and genes and how modifiable it is.

Katie: Exactly. And I think that's just actually the important point to drive home. It's wonderful that we have all this research, especially this new research that's only emerged in the last few years. And we should absolutely be grateful for it, and use it as a tool. But, those of us who had kids before this emerged, we should never...I never want to present anything that is going to be a source of guilt for moms. Or that makes them look back

and be like, "Oh no, I didn't do this right because I didn't know." I think that's what is great about genetics. It's like if you are in that stage of life, and you can modify first, it's wonderful. But it also is so encouraging that it's not set in stone. And we are now finding so many things we can do in every stage of life. Even those of us, now, like me, as an adult. They didn't have this research when my mom was pregnant with me. But, thanks to this new research now, I can use it to modify my life as an adult. So, I think the message of it is encouragement. But, since we are talking about generations, I'd like to go into kind of a subset of this topic that I believe you know quite a bit about. So, we've talked about how your stress level, and how your environment, can affect your genes on a very physical level. And so, you have written a little bit about how memories, even, can be passed through genetics, which sounds a little bit like a crazy concept, if you've never heard it before. So can you kind of give us an overview of that and how that works?

Jennifer: Yep. So, we basically know this. So this is something that's called transgenerational genetics. And so, what we've learned from past history, is that, there was the Dutch famine. And so women who were pregnant during that time frame, they, depending on when they were pregnant, and how much basically starvation they incurred during a specific stage of pregnancy, outcomes in their children and then grandchildren have been tracked. And so, we can actually...that level of what we would call a trauma, is passed on through multiple generations. And so, this is the same thing as seen in Holocaust survivors. So we used to think that children from Holocaust survivors, that they had some various outcomes that were different, in terms of health outcomes, risk of cardiovascular disease, you know, chronic illness, that those risks were higher. And it was thought it was just the result of the environment that they grew up in. So, their parents having suffered such a traumatic life, that then they basically raised their children differently. And what we have learned is that their DNA was actually marked in a way. So we did talk about marks, and some of these DNA marks with epigenetics that they are variable. But what we know is that some of these marks, are so kind of...that they end up almost being permanent from a trauma like that. So and also, you know, I speculate about slavery in the United States. And also wonder whether we are going to see some information coming out on that. Because I have not found any yet. But if you think about African American populations, as physicians, we know that they are at higher risk of hypertension. They are at higher risk of cardiovascular disease, of diabetes. And my theory is that their DNA was marked in a way from past generations that predisposes them.

Katie: That's so fascinating. And it's so amazing that our research is now at this level, that we can look so deeply at things that, I mean, even a few decades ago, would have been not even conceivable. I love that they're able to do this now. And as we get close to the end of our time, I'd love to hear your thoughts as a physician, and what you kind of see as the potential future of this kind of research and ways that we may be able to like apply this even more in the future, as we learn more and more.

Jennifer: Yeah. So, I just...it's a great time that we actually got a chance to talk today. But I returned from a conference called the Precision Lifestyle Medicine Institute. It's an annual conference. It's Jeff Bland's institute, where we just talked all about this. All the presentations were sort of geared to what does the future look like. And I can say the future looks amazing. The transformation of our healthcare system that we are going to see on so many levels. So this is not just something that is just kind of in the ether, and, you know, a few integrative medicine doctors are working on this, and it's just like piecemeal. There are major medical institutions, hospital systems, and networks. The second biggest network in the United States, who is working on transforming healthcare in this way, to foresee a future where babies, basically before they're born, they would have their entire genome sequenced. And helping to...you know, the research...the purpose of that is so we can catch things quickly, and even document what sort of markers happen as we transition to illness, so we don't even get to the point of illness. So we can start to see these things happening much more earlier, and intervene. So for more serious medical issues, that there could be the opportunity to intervene much more quickly and never see that conversion to a disease state, which sounds like science fiction. But, this is what people are working on.

And then ultimately, what I also know, is that the healthcare system is going to transform and be more one of wellness, and not just rushing to treat...you know, waiting to just treat a disease. That the goal is to change that paradigm. And that is happening right in front of our eyes right now, which is exciting. Change the

paradigm to understanding what promotes wellness instead of disease. And you know, I know that that's, you know, entirely what you're talking about. Like, what can we do to just stay healthy? Let's not talk about, okay, once you get this disease, then what type of pharmaceutical can you take for it. Let's not even get there in the first place. And it really, you know, looks very positive that that's the direction we are going in.

Katie: I agree. And I'm so glad that you said transformational medicine. Because I was also at a conference recently. And there was an interesting exchange between two people who would both probably be considered like kind of visionaries in the healthcare field. And one of them said, like, you know, "The problem is, we are dealing with a broken system." And the other one said, "No, no, no. We're not at all. The system is doing exactly what the system was designed to do. The problem is, life has changed. And we need a new system. We need to transform the system." Because, the current medical system is brilliant for what it was designed for, which is trauma and infectious disease. That's when a lot of modern medicine and the research really came to light, was in those areas. If you go to an emergency room in the U.S. and you have, you know, a broken leg, or you are bleeding, they are excellent, incredibly good at that. But now with all this new research, we need to kind of transform certain aspects of medicine to really take into account this new information. And that things like chronic disease are dealt with in a much different way than infectious disease. And that things like genes can give us data, like you said, before there is ever a problem. And so I love that there are people like you, out there, kind of pioneering this field and trying to take into account all of this and make it practical for those of us who are trying to figure out our own health. So I love that. That's such a great point.

Jennifer. Yeah. So I mean, exactly. You really said it very well there. That, you know, we are not going to see emergency medicine go away. And that's not the goal here. Or even, you know, there needs to be interventional medicine. And that's that kind of 10% of healthcare. If something goes really wrong, we have trained people who can take care of you, and do an excellent job with that. But, it is, it's chronic healthcare, chronic disease in that way that that system, that's where we are not doing a good job. And, luckily that really is changing rapidly.

Katie: Yeah, it's super exciting. So, a question I love to ask, kind of close to the wrap up of an episode is, if someone is just like starting to understand your area, which would be genetics, or this type of medicine. What are three things that tend to be just like good starting points. Like, if someone is just getting into natural health, or just trying to understand their own health, what are three things that you can kind of recommend across the board for them to do?

Jennifer: Yeah. So, I would say...so number one, I guess, I kind of said it at the beginning, that your genes are really your greatest opportunity. So think about genes as what we call your genetic potential. And that your lifestyle matters. So, I want people to understand and feel the power in that, that living holistically, reducing your exposure to toxins, which does...you know, we didn't even get on that topic too much, but that does impact your genetic expression. So the more clean you can live, the better you can manage stress. We can't make stress go away. I mean, we live in a modern society. But, we can do a lot to make our body not as reactive to stressors. So, that's probably number one.

Number two, I would say, is that, it's really interesting that the expression of your genes really vary with seasons is what we are finding in the research. And even more, we can even see that expression varies with time of day. So it's really fascinating that the recent Nobel Prize went to a group that had studied the Circadian Clock, and genes associated with that. So, even this concept of like, people get sick in the winter. Oh, it's because we are indoors more. There is actually some research that shows that that might just be a change in genetics. And there is some research that looks at that with respect to weight as well, that we actually can get thinner in the summer because our genetics related to fat burning metabolism have something to do with that. And we just perceive that, oh, that's just activity and I'm maybe eating a little bit lighter. But there's actually some genetic seasonal effects going on there. So, that's some kind of interesting developments that we found.

Third, I would say that probably a really good practical tip, is what we're finding is...and I'm going to give it because my background is in nutritional biochemistry, so I do love to talk about nutrition. The diversity of plants

in your diet is probably...turns out to be probably more important than the total amount of plants that you eat. So, here's something that is actionable. So, when you look at your daily diet, and you are looking at like, what does my plate look like? You know, we say, like, okay, make sure, you know, it's at least half vegetables. Now, we can go a little bit further. So I would like people to understand that I want that to be like a mix of food. So if you are eating berries, for example, you are probably better off eating a cup of mixed berries than a cup and a half of all the same type. And so, easy ways to get more of these plant compounds in your diet. To get more of what we call diversity. Use herbs in meals. Use spices. Those are rich in these phytochemicals. And use mixes of greens. So, even when you are eating a salad, don't just eat Romaine lettuce or just spinach. But get a mix. Like, get some baby kale. All of these little signals not only impact our human genome, it impacts our microbiome, in the genes of our bacteria. And we have about 20,000 human genes. But we have...you know, estimates are basically 2 to 20 million microbial genes in our body. And I'm sure you've probably done some podcasts on the microbiome. But this has that interplay between both our human and microbial genes. So, diversity. Diversity. Diversity. That's what I would end with.

Katie: I love that. I think that's a huge point, and it's such an actionable one. And like you said, in the research, if you look at what people ate 100 years ago and the diversity of their food sources compared to today. And like, isn't it like most Americans eat primarily five foods. And most of them are like soy, corn and wheat. And just the difference. And so I think that's a great one that anybody can start with right now. And I love that you talk about that. And I want to make sure people can find you. Of course you have your awesome book, "Unzip Your Genes." But, I'd love for you to tell them where to find you online as well.

Jennifer: Sure. So, I'm probably most active on Facebook right now. And that's at Dr. Jennifer Stagg. I'm also on Instagram. And, I do have a website, drstagg.com. And, we are doing some revisions there, and that's going to have a lot more content really soon.

Katie: Wonderful. And all those links, if you are listening and can't write them down, they'll be in the show notes, at wellnessmama.fm. And, Dr. Stagg, thanks so much for being here. You have such great information on this. I'll make sure all those links are there so people can find you. But thank you for sharing with us.

Jennifer: Thanks so much, Katie.

Katie: And thanks to all of you for listening. And I will see you next time, on "The Healthy Moms Podcast."

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