Introduction to Genomics and Precision Medicine

Welcome to another episode of Mycotoxins Mold and Chronic Illness Summit. I'm your host, Dr. Ann Shippy. And today we get to talk with Dr. Sharon Hausman-Cohen.

She has quite an impressive background with a master's and an M. D. from Harvard, and she's board certified in family medicine and integrative medicine.

And she's the founder of IntellxxDNA, which is a really important upcoming company for you to know about. What she does with this company is use genomics as a tool to help physicians and medical practitioners identify the contributing factors to medical illness and improve outcomes, and also to incredible prevention for people that really want to keep their bodies healthy.

And it's applicable in pretty much any area. But we're really seeing great outcomes with cognitive decline, autism and environmental illnesses. So welcome.

Sharon, it's so great for you to be here with me. I'm really excited about our conversation. I'm so glad to be here with you Ann thanks for having me.

You've been at this for a while. I remember when you first started this company and oh my gosh, you've been on such a mission to to really make something that stands apart from all the other genomics testing that's out there.

So it's been a really great tool for me to be able to use with my patients and actually myself. We can talk about that a little bit too. But I wanted to just I know this is a new field for some of the audience, and I just wanted to start out with defining some of the important terminology that we'll be using.

So maybe even just start with genomics. So genomics is the study of small changes in an individual's DNA that by themselves are not disease causing. But when combined with environmental exposures, differences in nutrition and other factors, even the interactions between different genes variance or snips, as we call them, can have a very significant effect on somebody's health and well-being.

Whether you're talking about physical health, mental health, cognition and genomics gives us insights into things like what kind of inflammation people might have, what kind of detox pathways are working better or less well.

And then from a standpoint of when you're talking about brain health, things like what neurotransmitter or transporters or even then again, what nutrients someone may need more or less of.

So it's it's a tool that allows you to personal ties your care down to what we call an N or number of people in the study of one. It's different than genetics.

When you talk about a genetic disease, you're talking about when you have kind of a a big mistake in your DNA. And that's actually a mutation where if you have this mutation, you're going to get this disease Tay-Sachs, cystic fibrosis.

If you've got two copies of those gene variants, you get those diseases, genomics isn't like that. You have lots of little changes. Kind of think of like typos or slight changes in a recipe.

It may have been a survival mechanism at some point. Right? It might have been absolutely. Absolutely. Malaria or other other environmental challenges that actually ended up being a survival benefit.

So that's what I like to tell my patients is that it's not necessarily a bad thing. And certainly in some circumstances

it's actually great to have these genes like I, I know I have some that are a double edged sword.

So sometimes they're really great for fighting off illnesses and those kinds of things. And other times they get me in a little trouble. Absolutely. Having more inflammation can be good.

If you're fighting an infection, it can be bad if you're getting an overzealous response to mold. So there's this term floating around called precision medicine.

And I think it's an important one for people to kind of know that that's an option. So if you wanted to find that term, that would be great. Yes. So previously and still to a large extent, when people go to medical schoolor practitioner school or even naturopathic school, they're given algorithms and different ways of approaching.

Here's the way to approach depression. So kind of a classic way in allopathic medicine is, okay, you're going to start with a serotonin medicine. And here's a way of approaching high blood pressure.

Start with this. If this doesn't work, do that. And end of one medicine in or precision medicine is wait a second, let's take a step back and let's look at what we can find out about this person so we can make our treatments much more specific to what's going on for them.

So if they truly have a problem not making enough serotonin and not recycling enough serotonin, then the serotonin medicine or natural things that raise serotonin might be good.

But what if their mood problems relate more to not making enough norepinephrine or too much inflammation or different growth factors or nutrients? So precision medicine is about let's try to find out much more about the person.

And instead of having global ways of approaching things, treat each person as an individual, which of course makes a lot of sense because we have the ability.

Yes. And it's really fun when it is. It's much more fun. So, you know, hey, this is really what my body needs or this is what my patient's body needs.

So and then how about epigenetics? Do you have a good definition for epigenetic? Absolutely. Epigenetics. It was first described well before we had sequenced the human genome, and it's the word to mean on top of genetics.

And it has to do with how things in your environment as well as things you take into your body. Like nutrients can modify your own genetics. So we know that plastics are a big epigenome modifiers and change a bunch of gene expressions like that's why we took BPA out of a lot of canned foods and say don't drink from water bottles that have BPA in them.

But what we do in terms of even exercise can be an epigenetic modification, meaning it can change how our DNA is expressed or modulate it. So it's just saying using diet, lifestyle and environment to modify or modulate DNA.

And even take. Yeah, taking certain supplements and things helped to modulate, too.

How Mold and Mycotoxins Affect Detox Pathways

So I what I want people to really take away from our talk today is, yes, you might have gotten some genes that maybe make you more predisposed to environmental medicine or illness, but there are things that they can do to even help those genetic and the genomics. Yes.

And you and I are both on the same page with that. That's what we do in our practices is, okay, your DNA is not your destiny, but if we understand it, we can address it.

And you don't have to look at anything pathogenic, anything disease causing to improve outcomes. You just look at

all these little pieces of the puzzle and say, I can get you.

Well, you mentioned medicine's more fun when you do personalized medicine or precision medicine. And I agree. But I think the reason is because we get people well and they they feel better.

Yeah. And getting to the root cause, I mean, really looking at this as part of understanding the root cause of the illness so that then you actually get people well, rather than validating the symptoms wrong.

I agree. All right. So let's dig in. So the most important things for for people with mild and chronic illness to know as far as some of their genomics that they can look at to better understand why they got in this situation in the first place and what they can do to start to remedy that.

So I think that the first thing that they understand about genomics and chronic illness is there's a couple of different things. The Mycotoxins. So just in terms of a definition that there wasn't this Mycotoxins summit, but Mycotoxins are kind of like the bullets shot out of the gut.

So the mold toxins that cross into the body can interact with genes and turn on and off genes and even turn on and off mitochondria. So when you're talking about mycotoxins and genomics, you're talking about how do we respond to the insult and the whole cascade of events that the mycotoxins create.

And so there are enzymes which are coded by genes are genes of course is kind of our blueprint for ourselves that are needed to remove the mycotoxins such as glutathione transfer cases and these efflux transporters.

So those are really important in how you respond to mold efflux transporters when you're talking about genes, they start with A's, ABC like ABC1, ABC2, and so of ABC1 and ABC2, for example, relate to are you able to kind of go, Wait a second, I've got to kind of kick this out, this, this particular mycotoxin out of my gut or out of my brain.

So aflatoxin, you can't kick it out if you don't have a good working ABC1 in your brain, you've got more brain fog. But then there's also. And that's a direct injury down right where it because the toxins are just more likely to build up in the different tissues.

Right? You're going to have a bigger issue with it if you have if you're kind of bad and some people say I'm bad detox or I'm for detox and I would my question to them would be like, well, why is it because of the good of science?

So again, we're using a lot of big terms. So I'm going to kind of give analogies. Glutathione is the true quicker picker upper bound, do you think better now but your body glutathione is that paper towel it picks up stuff so you can carry it out.

You can carry it out through your urine, through your sweat, through your gut. And so if you have problems with that, that's one way that we would fix it or work on it would work in your glutathione systems.

There's also also ways of what we call conjugating different toxins so you can eliminate them that the liver helps with. And then again, there's these these bouncer genes.

So those are all important for detox. Now, part of it is what are your own genomics? And part of it is realizing that different toxins will upregulate different swipes.

Some of those there's liver enzymes that help to remove toxins. So that's why it's so hard to fight mold related illness because the mold can make it so that you're a worse detox or than normally.

Mold also can affect something called the nerve to pathway, the nerve to keep, which the way I remember is nerf balls are fluffy and good. So Nerf is good, you know, and and keep is good and you want to have a good active nerf because that's anti-oxidant, that's a protection against your mitochondria getting damaged.

Well, mold can already turn down your nerve to pathway but if you're genetically about 2% of the population are really bad at making nerf too. And if you're already genetically bad at that then you're going to have excessive oxidative stress.

Why do we care about these different things? Because it's going to give us ideas. You know, there are hundreds of supplements and nutrients that we could prescribe or take, and we want to be able to figure out what's going to help you as a particular patient.

Those are just a few in the pathways. And what I love about what you've done with the database that you've created with Intelxx is that you tie those particular up opportunities to each polymorphism so that it is very actionable.

You there's it's very clear to me now what I can be doing to keep myself out of trouble and really trying to help those genes work better. Yeah. And so there's some things that everybody who's exposed to more, but almost everybody would benefit for since we know that mold, for example, turns off nerf, too.

And we know that Sulforaphane, which is some three day old broccoli sprouts, turns it on. That is a great intervention. If you don't have access to your genomics to kind of get started on your general detoxing with mold.

And in fact, I started treating mold in the days before we knew a lot about it. And one of the hardest things was dealing with the brain fog. And once we once I learned about Nerve two and the role of Sulforaphane, I wasn't having to use any of that.

Oh, let's try, you know, intranasal VIP and all these different things for brain fog, because just getting back those nerve, two dependent anti-oxidant and detox pathways and kind of giving them a relatively high dose of a sulforaphane and you need to use a good quality sulforaphane that has a roasted ace or moringa in it.

Moringa is another anti-inflammatory that helps to activate the precursor, the the right products behind Sulforaphane. But then it was like, okay, now I just had to deal with everything else, the inflammation in the pots, but the brain fog went away quickly.

So that's kind of my if you're only going to do one supplement for mold, that's I don't know what your favorite is, but that's one of my favorite supplements is to use a Super Fang producer.

Yes, but I'm now I need to go back and make sure that it has the more innocent it. Do you have a I'm good talking with brands. Is there a brand that you like?

I like to use the brands that have the data in the study. So I generally will use AB McCall or AB McCall professional, with the reason being three day broccoli sprouts are where we get this product called glucose rapid in from an but it has to be activated by your stomach.

About 25% of people don't have the enzyme, enough enzyme in their stomach to activate it. So when you package it with the roasted taste or the moringa, you're going to make sure that even for those 25% of the people, they get good activation.

But the real thing is if it's not get properly made, you're not going to get it. Good, good success. But they have done studies in autism, schizophrenia, cognition.

So that makes me feel comfortable that this ends up with good outcomes, that this product is properly made and crosses the blood brain barrier, because I think that's a really important.

Important thing. So admirable too. Or just as a side note, when the supplement companies actually put the money into the research because it's, you know, it's not like a drug companies where they can easily, you know, put a patent on and make a lot of money from it.

It's it's a it's a huge commitment for the supplement companies to to do absolutely. It's hard to patent three day old broccoli sprouts and you can grow Brussels sprouts.

You can you can take mason jars, people can look online and you take like canning jars and mason jars. You buy the seeds, you grow them with a little bit of like a wet paper towel or a little moisture.

And when three days after they sprout, you throw them in your salad and you do it again. And that that absolutely will help those genes. But there's another piece of the genetics that when you're ready we should talk about because the genetics of not just what does the mole do to your body and affect how that interacts with your genetics.

But it's the downstream genetics, the patient, how are their mitochondria and their inflammatory pathways and some of their nutrients do want to talk about some of that.

I would love to because this is actually one of the biggest things that I see, especially with the neurological issues where there's been the mitochondrial damage that I measure through a lab and that we actually send the blood to germinate to get the best the best measurements for that.

So this is such an important topic for people to heal because when the mitochondria are damaged, it's hard to get that momentum for the body to actually do that repair.

So, yes, dig in. Okay. So I thought I would give an example of two of my favorite mold patients and some of how their key snips were different. And so their histories sound almost the same, but their solutions differed.

Targeted Support for Brain Fog and Mitochondria

11 So Judy had presented with mold exposure tons of brain fog and low energy, and Noreen presented with memory issues when she was near mold. Again, low energy, but more of kind of like a pots type type pots for people that don't know it is when you get low blood pressure and kind of tachycardia and weakness.

So she was so there were really similar histories but with Judy when we looked at her genomics they both have significant things there genomics but for Judy she way over made lions may she way over made TNF alpha 10th alpha anything that is like puts an alpha under it Interleukin one alpha TNF alpha.

It usually is a pretty important pathway if it was named with the alpha kind of think alpha male alpha dog and she's in the 3.8% of the population that overexaggerate, she kind of overturns on that TNF alpha gene.

So addressing that with like lion's mane mushroom things like magnesium three and it was really important. But she also had something called CNR one, which is your endocannabinoid pathway.

And again, these are lots of big words, but think about people know that CBD is a cannabinoid, so endocannabinoids are these receptors in the brain where CBD works, but they also regulate micro glial inflammation, which is brain type inflammation of the garbage collectors.

So now if you're getting mold in your brain or mycotoxins and you have have problems where you're microglial getting over activated, that's important.

And that kind of a particular endocannabinoid, an inflammatory response, she also could not make. Positive for just a second. Yes, this is really important.

I think so. I think a lot of people don't realize that they actually make endocannabinoids in their body and they think it's just this plant that's grown that people make into a supplement or smoke.

Right. And and so it and it really does end up being a really important pathway in the body that we often overlook in medicine. And so what did you do to help her with that?

So there are a couple of things you can do diet wise, chocolate's really good for the endocannabinoid. Pathway that you're prescribing chocolate. Maybe that's why some of the.

Chocolate so much chocolate and olive oil are some of the best foods. But there's something called pomodoro. Let the no mind that can help to address those inflammatory pathways and kind of activate it.

And it works, works really well. And one of the things about genomics is you would never be able to evaluate someone's endocannabinoid pathways from blood because the endocannabinoid receptors are really only in the brain, the spinal cord is spinal fluid and the gut.

And so you could draw the blood, but you can't measure them unless you're looking at genetics. So that's really helpful. But for her, we gave PDA because it also has some other anti-inflammatory effects That's.

Really gotten much more of an appreciation for that supplement in the last couple of years. Yeah, it's kind of one of those under under spoken or under-discussed supplements.

But again, it works on some very specific pathways that maybe only 6% of the people have. And so it's really powerful. If you're in that 6%, it might not help everybody, but it did help her.

Another one of the fun ones that was really helpful for me to find out about her was that she didn't recycle vitamin C well. So we have these gluten file transfer cases that are kind of the quicker picker uppers, but there are also glutathione, iron works, helping antioxidants.

Vitamin C is an antioxidant. So glutathione, I own just one and just got to work with vitamin C, and if you don't have those working well, you can't kind of recycle your vitamin C once it gets oxidized back to an antioxidant.

Well, what does that mean? It's kind of like if you couldn't keep reusing your if you have a towel and you couldn't reuse your towels, you would have to have a whole big stack of towels.

So you need more vitamin C throughout the day If you because humans don't make their own vitamin C, we only get it through diet. So that's really important because vitamin C is one of the cofactors for some of the detox pathways for mold.

So that kind of thing was important. And then it was also found for her that she was particularly sensitive to gluten, which can make the brain fog worse, that she had seven times the risk of celiac.

And then finally she had a gene variant that made it so that her mitochondria got damaged more easily. That outer membrane wasn't as healthy. And so for her, her plan was really important for her to have mitochondrial support.

There's a lot of different products that kind of are designed anti lipid factor and ATP fuel and PACs and things like that might occur. But you wanted one that had mitochondrial lipid factors in it.

So again, for those that really probably the best study one is is ATP 360 has that mitochondrial membrane support. And so for, you know again what does every multi patient need that not necessarily does every patient need vitamin C?

No, not necessarily. Just everyone need lion's mane. No. But for her, those were kind of the basics of her plan now. And Noreen was the one who was kind of like she was I first met her when she before she knew that her house was moldy, when she would sometimes have to lie down when she came into the exam room because she was so lightheaded.

She wasn't really tired, but her she would stand to longer sit you long. And her, you know, her blood pressure would drop. And this was really, really interesting because a huge factor for her was pathways related to her mast cells.

And so do you want to explain what mast cells are for for our listeners? Yes. Well, actually, why don't you go. And make. Sure you're doing such. A great job?

I just I don't know. It's listening to me. No, no, you're excellent. You're I, I really appreciate how you're putting these pieces together. And. And I actually I'm really enjoying listening to your analogies of things because you just have a really great way of explaining the information and tying it together.

So I'm curious how you describe them. Well, thank you. And feel free to jump in on any of these apps. So mast cells are your allergic pathway and some people, even if they're trying to fight an infection or a mold or whatever they're trying to fight, they kind of switch over and start making instead too much of the allergic pathway.

Well, that it releases histamine. So think about how antihistamines can make you sleepy, but too much histamine can make you wired, but it also can make your blood vessels more relaxed and kind of like with some gets a bad allergic reaction.

They get all red and flushed. Well, if all of your blood vessels start to get relaxed, your blood pressure can drop. So it's one of the contributing factors to people who get this kind of dysregulation of their blood pressure is their way to in the mass cell realm.

And so when we have someone like that, the mold Zheng going to trigger it and make it worse if they're already hypersensitive to that allergic pathway.

And one of the ones she had was called interleukin four and the interleukin four receptor. There's a number of contributing factors, but how do you address it?

Well, you can you don't want to just give antihistamines. That's like trying to wrangle in the cats after you've let the, you know, the expression that comes out the back, that's much harder than just keeping the cats from leaving the bag.

And so I love your analogy so much. It's just so. Vivid and crazy, but. I'm going to use some of them. I hope that's okay. I think it's just over the years.

I like to get things to help people remember them, but we gave her tons of quercetin so you might give someone, you know, one capsule of Quercetin She's on like six capsules of Quercetin a day because Quercetin is a very potent cell stabilizer.

But it took a lot. We also gave her some gladiolus and then we used some of the prescription things like Montelukast. She also she did not have all the mitochondrial issues, but she had huge inflammatory issues.

So again, it was different. It wasn't TNF Alpha. She had more interleukin one alpha and interleukin one beta, and those two can interact. So again, supportive and can help that.

But curcumin helps to coat the question helps a little bit. But the other thing that was part of what made her so prone to low blood pressure is some of her, you know, some of her nitric oxide pathways.

And so addressing that, that she she wasn't properly regulating her ability to make nitric oxide which opens up blood vessels. And part of what made her feel weak was she was in this is a really fun one.

She was in the point 1% of the population that had this specific gene variant in a gene called and PD one. And again, it doesn't really matter what it stands for, but think about ATP AMP, they're all kind of related to adenosine monophosphate and your ability to.

Go had to make the energy, you know, to do the work that the cells need to do. So yeah well and this particular snip is associated with being able to store that extra energy in your muscles.

So if you can't store so people they studied it in people who are trying to run that have this snip and they like have to take ribose before they exercise because it kind of gives them some ability to have a little bit of stored energy.

So she had all and then she also had something called. Seeing some of these implications of her genetics probably are her whole life, right? She probably didn't like gym too much or exercising.

Right. She was not. And so yes. So you do kind of and sometimes I'll ask someone, do you get tired with exercise and go, No. And then I dig deeper and they're like, well, what kind of exercise do you do?

Well, I walk well, how far do you walk? You know, they walk a mile. And the whole thing is they've learned since they were a child, not to do that track, not to play softball, not to play tennis, because they don't have that muscle reserve.

So they might instead do something that, you know, get into music or art, but it gives them the ability to exercise once we understand that. And those genes can also affect whether people tolerate statins.

It's not all about CoQ10, although she also had problems recycling her coca and her vitamin E.

Case Studies: Different Genetic Responses to Mold

So again, the reason I wanted to give the comparison is there's a lot of different pathways and it's not going to be found with one or two genes or one or two variants.

And we can talk about the difference in a gene in a variant. But you really have to create a map for the person and go, what are the things that they have that make them unique, that relate to this disease state that are in gene variants that we know are clinically significant?

You can't just like look at a list of gene variants and go, Oh, well it's it's a variant, so it must matter if that doesn't how it works. What So back to the nitric oxide.

So in addition to giving her de ribose, what did you do to help her? So her dysregulation. So it depends on which way the dysregulation is. If the dysregulation is that you are expanding too much, then you're going that would be one thing.

But for her it was that the the lining of the blood vessels wouldn't relax when they were supposed to. So that created a more brain fog because she wasn't getting enough blood to her brain.

So we gave pic dodgeball because that will make it. So the endothelial, the lining of the blood vessels produces more nitric oxide and relaxes hyper barracks is phenomenal for that.

And you know, since we're mostly adults here, one of the things that not having enough endothelial or no is three endothelial nitric oxide creates is there's another really important blood vessel that has to be able to fill and relax in men and that can affect their function as that relates to libido.

And if you use technogym on arginine in this, this particular gene in a man that she had two copies of, which is 12.9%, has been associated with a dramatic like a five fold or a 400 times increased risk of erectile dysfunction and addressing it with peak marginal along with the amino acids like arginine or citrulline can solve that problem in over 90% of the time within a few months.

So these are really important genes. Yes. So I'm sure that there are people in the audience right now being like, Oh my gosh, I want to do that test. And they may not have access right now.

Those are just such great stories. And you know, all of these supplements and things that you've talked about for solutions, I don't see any harm in trying some of the things.

If you if the people listening hear some relevance to what they what they're experiencing. So they're they you can do some trial and error, but it's much more direct if you actually know your genomics and have something.

That works silently. And I think again because I want to be helpful to people who get if someone wants to do genomics, they can go to intelexxDNA, which is to ALS and to access IntelexxDNA that common they can find a physician or a provider near them that's trying.

But in getting started, I would start with the ones that we know mold is going to affect. We know because the mold itself directly is going to affect those mitochondria use the mitochondria support if you're feeling fatigued.

And again, the ones that some of them have more kind of are the inside the mitochondria, some have more of the mitochondrial membrane that you some mitochondria support and then use and things that push the detox the sulforaphane you can use.

Some people really benefit from the defiance. The problem with good often is it's not very well absorbed. So you definitely have to use a liposomal or like a nasal, which is prescription or a sublingual.

But also neck. Mac is a really good one to talk about because NAC, which stands for Intestinal system, will turn and help you make more glue to fail. It's one of the that there's always what's called a rate limiting step in chemistry and that's like what's the slowest thing.

So in bread baking, your rate limiting step is baking powder or baking soda. You're not going to get the bread to rise if you don't have it. The only small amount, but it's not usually something you have huge amounts around.

And so cysteine is the most important thing that we tend not to have as much of in our body for making glue. If I am so NAC helps that. But as a gene regulator that epigenetics, it also helps you to produce more, you know, to affect some of the inflammatory and some of the other pathways.

It can affect that which is Sulforaphane does that as well, supporting turns on and off a number of genes. So I would say that those are kind of the big three.

Vitamin C is good to make sure you have enough of because it's part of the mold detox pathways and after that, you're right. If you're having a lot of mast cells, symptoms like tending the flushing, you can guess, you go, Wow, I think I have a lot of histamine type mast cells, symptoms.

Maybe I'm going to try out in question. You should know that Quercetin is a little bit of a blood thinner. So if you go to too high, be careful that you're not getting bruising or things beautiful.

I'm loving that. So many other areas that I find super helpful with my patients is looking at their methylation, genomics and they'll spend a little time on that too, because I know that that's an important part of what you do.

So absolutely so MTA in and methylation genomics, people think of that as kind of one of the ultimate epigenetic regulators just because the ability to put a methyl group on something will turn off different genes.

And so that's that so is definitely part of that. But it's also really interesting because the methylation pathway which relates to homocysteine levels and all these other different factors that relates to making Sammi, it feeds into our ability to make our brain chemicals, serotonin, norepinephrine and dopamine.

Those do important things like serotonin. It makes you feel happy when you're holding a puppy. Norepinephrine is energy and motivation and concentration and dopamine is pleasure.

So kind of more of like the kind of pleasure when you're achieving something like when you when you win at a video game. And so if you don't have a good ability to turn your folic acid from your food into methyl folate, you're not going to make your brain chemicals as well.

But it also feeds in to whether you are going to be able to turn off other important genes and help with gene regulation. There's other parts of the methylation cycle.

One, for example, part is a gene called C. Well, it's right below is homocysteine gets converted by CBS to justify. Well, why do we care about that, Jane?

Well, if you can't convert your homocysteine into Sister Thiamin, then you're really going to need that Mac, because you're not going to have any of the cysteine ultimately to make your glue to fire.

There's genes that relate to ADHD in that methylation cycle because they can affect to your ability to kind of repair your DNA and have other enzymes, and that can affect concentration and your ability to make something called the thiamin, which again is key as the kind of the beginning step for turning on a bunch of enza enzymes like Conti.

It's the true methyl later. So the methylation cycle is pretty popular. I think that if R got kind of a bad rap is one of those dirty genes and I don't think that I would label it as a dirty gene as much as it's an important gene, but it's still just one piece of the puzzle and it's not that big of a deal for people with one copy of it is 47% of the population that have one copy, but with two copies, it does become a big deal.

And then you go, Well, why is it gotten associated with depression and why is it become a bigger deal? I think it's because we started putting folic acid in our breakfast cereals and in our food supply and so people who weren't good at turning folic acid into methyl folate, they became even worse at getting methyl folate in their brain because the folic acid kind of gummed up the transport pathways to let them get into the brain.

And you already low. So that makes sense. Yes, that makes a lot of sense. And it does show like the natural consequences of some of the decisions that were made in our our food industry actually causing more harm than good sometimes.

Yes. Unintended consequences, a big factor in the world. And but what I love about this, the methylation pathway, is that, you know, so great to look at the genetics and be able to measure actually measure in the lab so many different aspects of the pathway to get a feeling for where it's getting challenged and not full flowing.

I think about it as a series of cog wheels that are all working together and and passing things along and, and it really does make such a difference to get it flowing smoothly and, and how well the body can repair and Absolutely.

And it's important also because again some of the pathways if you have problems with them like MTA Jabar methyl folate is going to be really an important supplement supplement but depending on where in the MTA, each of our gene like which variants, some people know the numbers, the c67 70, that one is right in the riboflavin binding site.

So if you have that one metabolite and riboflavin can help and some of the other ones, you only need methyl folate. But then there are other genes that are B12 and B six dependent that are in that methylation cycle.

And again, you could just take everything but the problem is then there's other ones that respond better to filmic acid compared to methyl folate. And so you can do kind of a shot in the dark approach and you absolutely will get some benefit.

And there's some good products that have kind of a little bit of this, a little bit of that. So there's a, you know, a methylation supplement called End Light that has some good studies and depression kind of puts a little fill in a little methyl folate, you know, B's 12 B six.

There's one called neuro nutrients that would support that. Also ads like precursors for serotonin and some saffron.

Methylation, APOE, and Cognitive Risk

So there's good combination supplements and you can just do a shot in the dark. But sometimes if you're having some chronic illness or you're having severe problems with your health, the more information you're going to get,

the tighter your protocol can be.

So if you're having cognitive decline, the more may have kind of brought it out. But you want to understand the components of it because the mold is just kind of making you realize younger that you have some gene variants that can be problematic later on.

I didn't really talk about that with Judy and Noreen, but Judy had a variant that gave her 3.4 times the risk of Alzheimer's. And then Noreen had a different one that, you know, affected.

And so Judy's was that APOE4 with the Tom Ford, with the kind of the mitochondrial stuff. And Noreen had a different one that was micro glial, but also had like almost four times the risk.

So they're getting their brain fog early because the mold is causing all these inflammation. So you want to understand it because that can be not only your ticket to helping you heal from the mold, of course, getting out of molds important, but also to come up with a plan to keep your brain healthy for years and years and decades to come.

And that's super important. That's another thing that I really love about your work because lot of people are checking those APOE genes like that. It's, you know, part of a Boston Heart or and so many places they're doing it.

But then people are just left with the fear that they're going to get the diseases. And so share a little bit more about your thought process on that and how this approach can really, you know, put people into like a normal risk or maybe even less by taking these actions.

Because I think once you know about it, they're actions that you can take that probably reduce your risk, right? Absolutely. So I have lots of people.

So Avery for is thought of is the Alzheimer's gene and it that particular variant is found in about 22% of the population. First of all, it only explains 40 to 60% of people.

Only 40 to 60% of people who get Alzheimer's have that gene. So there's a lot more to it. But you can have a way for with genes that lower your risk or ones that increase your risk.

And by addressing the whole picture, you can absolutely improve your cognition. So I always say that APOE4 is either too much information or not enough.

And the reason is, if that's all you know, it's just going to be a fear tactic. But when you know, do you have it combined with these different things that can either cut your risk in half or increase it even further and you know how you can address those different particular risk factors that you have or those variants that have been associated with problems with cognition, then it becomes empowering.

And that's what we're trying to do at IntelxxDNA is give patients and clinicians a map of empowerment. Dr. Dale Bredesen, who a lot of people in the cognition space are very aware of, uses our genomics as part of his research.

So there's a publication that was in the Journal of Alzheimer's last year and again if you read, they'll talk about using genomics to help add further specificity to their decision making.

That's our genomics. It's also being used in other memory studies and a very a larger study that Dr. Bredesen and his colleagues are doing now. And again, it's the same thing.

It doesn't matter whether it's a child with autism, a young adult with anxiety or a senior that's starting to know that their memory is going. Brain science is really hard without genomics because of the blood brain barrier.

So you can check things in the blood, but we purposely have differential tissue expression and that what that means is if you turned on 25,000 genes in every cell in your body, you would be a mess of chaos.

So we have different things going on in our brain from in our blood, and we have to keep them separate. And so when you do a blood draw, you're only doing like a blood biopsy.

What would it take to get information about the brain? And easiest and this is not easy would be a spinal tap. At least you get the fluid from the brain.

But it would actually take a tissue, a brain tissue biopsy. Well, that is clear. We want to do that. So we don't do that. You know, so know some things you can get from the blood because they cross the blood brain barrier and kind of seep into the blood.

But even something like TNF Alpha, the levels could be 40 times higher in the brain than they are in the blood. So genomics is really, really helpful with lots of chronic diseases, but particularly anything brain science.

And you know, we're in an autism epidemic. I the late when they were comparing the 2018 to 2020 numbers because just a couple of months ago, it takes a few get a couple of years lag behind.

It seems to me like that's as big of news as the pandemic that we just went through. I think it's like one in ten boys now have are somewhere on the spectrum.

So we know for sure that autism is has a mold influence. And so I know that there you're working with some practitioners in the autism space to really dial in how to help these kids to actually reverse their autism symptoms, not just Band-Aid things, but really help them to recover and I'm so excited about that.

If you want to just spend a minute on that, that would be great. Yes. We now have practitioners trained in over 30 of the states plus we have you know, we have people doing telemedicine and we have a couple publications in the autism world.

And I would actually say that one of the reasons that I'm not yet ready to retire and that I keep going is is really partly our autism work. That has been the most fulfilling for myself and my co-founder, because children's brains are very plastic.

So when you have a child that a lot of children with autism, they start out developing neurotypical and then around two or three they start to regress.

And when you have a child that is especially in that category of autism, which is the largest group of people with autism, if children if you can figure out what's going on, some of the same things we talked about the detox pathways, the inflammatory pathways, the mass pathways, the nutrient pathways.

But then there's also for all of these disease states, there's very specific pathways, specific ones for Alzheimer's, specific ones for autism. And again, if you can figure out some of them are mitochondrial, some of them have to do with how the brain scaffolds.

So think about scaffolding on the outside of buildings when the brain is being developed. It has scaffolding issues. If you know that a child has scaffolding issues and that one of the things that that scaffold needs because you're having problems where you don't have enough of that scaffolding, protein one is called shake, three is zinc.

Well, then you can really give them much more and you go, Well, why is autism skyrocketed? Well, it's a mixture. So nutrients people used to eat things like organ meats, like liver that were high in zinc and now they don't.

So people have lower zinc, lower omega threes, different nutrients in our soil. The the bread condition, those that are being used affect other ability to have other nutrients be active.

But then they also the addition pesticides glyphosate which is roundup with a sprayed on their crops that causes more autoimmune disease which triggers more inflammation because it makes the gut more leaky.

So there's all these factors and so the autism work is no different than what we've been talking about, just a different set of genes. And you take a map and you just slowly start addressing it.

What can we do for gut inflammation and detox, but also specific genes associated with neurodevelopmental issues? And we're getting outstanding results.

There's a couple of papers on the web page, but there's a lot of work ongoing, including a couple of studies. That just makes my heart so happy that. It's really we just trained a group of pediatricians last weekend and they were sharing their own stories.

And the cool thing is they were saying they're now using this on all the kids in their practice. And so it's it's even the kid that's just a, you know, it was my as my co-founder said the kid.

This just being a butthead. Turns out when you address their genomics four weeks later, they can be completely pleasant. So the child is having some mild oppositional defiant issues or anxiety or depression.

A lot of times it can be fixed by understanding what nutrients they need, more of which neurotransmitters they don't make well enough and with no prescription medications.

So it's it's not just about autism I think it's that we wish that our children and we came with instruction manuals. But our genomics is really our instruction manual.

That's, you know, been such an early adopter with the genomics work. I began doing genomics testing almost 20 years. And so every time a new company came out, I would try it out on myself to see how applicable it was going to be for my patients.

And, you know, some of the early things were super helpful, especially around some of the methylation genes and early 2000 genes and that kind of thing.

But when I did my Intelexx test, I was like, Oh my gosh, this is like a library. That explains why I've had autoimmune disorders and neurological impact from mold and, and, you know, the celiac disease and all the things and, and it's made me feel so empowered to really know what the priorities are in the supplement protocol and lifestyle protocol.

So personal thanks to you. But then also just seeing it. Thank you really helped my patients. Thank you. And that's what we're seeing. It just you know, we built this because it was a tool that was needed.

Autism, Recovery, and Practical Mold Rescue

And people where you and I, we get the patients that are in the medical mysteries because if they were, they were easy and the kind of protocol fix them, they wouldn't be going to somebody who has integrative or functional medicine training and we're it's also very empowering because when you find out, okay, the reason that you had a bigger inflammatory reaction and that you got brain fog after this infection is because you are in the 4% of the population that over makes this this basically chemokine this enzyme, inflammatory enzyme that destroys tissue.

And so we need to bring that kind of brain inflammation down. It not only helps them get well, but it makes them feel a deeper interesting themselves.

I had one patient and she's almost 70 now, and she she came to me for a number of issues migraines, depression. And we've untangled them all and she's doing great.

But she had a lot of different gene variants that related to her depression, which in some with her gut that related to migraines and all these things, which she told me when she was a child, she was constantly being told, just get over it, just get over it.

And when she understood that she couldn't mate, she had just so many things that cascade couldn't make enough

serotonin couldn't make enough, norepinephrine made too much, cortisol couldn't recycle it, just like just the perfect storm.

And she's like, and she used to hate Christmas because winter was that was worse. And that was partially because she had some genes where the seasonal affective disorder would have been more of an issue.

And she's like, not only have you given me back the ability to celebrate Christmas and enjoy it with my children and grandchildren, but I now am able to go back and forgive myself and go, Gosh, I didn't do anything.

I wasn't being a bad kid because I was depressed. It was because I didn't understand what I needed to keep myself healthy. And so I think that was very empowering to be able to to do that.

That's a beautiful story and that leads into all kinds of other conversations that we're having in the summit around trauma and our inner voice and those kinds of things that play an important role in healing.

So one last question, and that is rescue. When you get get a mild exposure, I think you have some thoughts on how to get yourself back to a baseline. Yeah.

So the first thing that you and I probably spend more time than we would ever have imagined that we spent is getting out of the environmental exposures.

I mean, sometimes it takes a long time to convince somebody to get out of your home and that if it's moldy and that's super, super important, if you're at the point where emotionally you can not kind of do it right, then go and find a friend to stay with for a couple of weeks, go to an Airbnb, go on vacation if you feel better.

Your gut's giving you important affirmation. So get out of exposure is really important. Do what you can with food really, and lifestyle really important.

Sauna helps with detox, so sweating is good for detox and then start with those basics. And so in the studies. So I can't give medical advice to anyone about my patient.

But I can tell you in studies in general for using something like a sulforaphane, like in the amical studies of children and young adults, and they went up to full size people because they were looking at boys that were 18 years old.

They did one of the the pills of the Amcal per 30 pounds of body weight. So that gives you an idea. But so you're not going to take one pill or something and you're going to be fine with mold.

So talk to your doctor, particularly someone trained in integrative or functional medicine and look at what you can do and really first start pushing those pathways that we know.

That's why I said that. Nerf to the detox pathways Sulforaphane Glutathione and producers, mitochondrial things. Start with that and then you'll have to either get genomics or experiment because there's so many diversions.

Do you more of the mast cell, Do you need more of the TNF alpha? Do you need more of the IO1 alpha? Do you need more choline for brain repair or do you need more?

So there's some people who really, if you're getting a lot of neuropathy symptoms within weeks, talk for hours. Some people do much better with neuropathy using high dose B12 and splenic acids.

But again, you it really is great if you can have somebody trained in this area. So for any physicians listening, anyone who wants to be trained, please reach out.

We'd be happy to train you. We have a mentoring program. If you have a patient you want to get started on, we will give you our training and mentoring program with your first patient because we want you to do well is more about helping more people.

And I think that we just need more people and you'll find it even if you are just kind of beginning your integrative or functional medicine journey, we can help you with genomics because it's going to give you a map.

And so and so I think that that's the thing is if you're interested in this field as a health care provider or a patient, this is where we need to move medicine to because it's just.

Really is one of the best tools for getting at the root cause and then finding solutions to help the body to heal and then stay healthy. Yes, but I'm just saying we need to move medicine and in a broader sense, to not thinking about a disease state, mold related illness, depression, anxiety, cognitive decline, but thinking about, okay, why is this person reacting to mold and their husband is not and that is where personalized medicine can help, is understanding why one person reacts and the other doesn't and how to get that person well.

Beautiful. Well said. Amen. Thank you. That's I think that's a great place to to wrap up. But I really want to make sure that people clear on where to find you.

So it's really the hardest part is the spelling. But it came from an intelligent approach to DNA. So it's intellxxdna.com. And the two X's are because myself and my co-founder are both women.

So I do know that piece. That's why we thought about calling it two dumb Chicks DNA. But I didn't really like that name. No, no, that's that's not the.

So just the way you brought your vision to life and the number of people that are benefiting from all this hard work that you've been doing to to make genomics highly actionable is it's such a gift.

So thank you so much for for really making this come to life. Well, you're very welcome. It has been the most satisfying part of my career to be able to to use the site to merge the science knowledge and the medicine knowledge and the genetics knowledge and all these things that were part of my my life and my training and bring them together to make something that people across the country in the world can use.

So it's been my pleasure. And I think it gives a lot of hope. Thanks, Ann, thanks for having me. Thanks for being with me.