



Your Functional Medicine Expert®
Jill Carnahan, MD ABHM, ABOLM, IFMCP

[#92: Dr. Jill interviews Kashif Khan about how to Hack Your Genes To Reverse Aging](#)

Dr. Jill 00:11

Hello, everybody! If you were here earlier today, this is the second live we're doing today. I'm super excited about this one with Kashif Khan. Am I saying your name right?

Kashif Khan 00:21

You can say it however you want.

Dr. Jill 00:23

[laughter] You're so awesome because I'm horrible at names and spelling.

Kashif Khan 00:27

The funny thing is that it's actually Kashif, but I didn't know that until I was 18 because I got called Kashif growing up by everybody. Finally, one day, my mom told me: "I think I should tell you how your name is pronounced."

Dr. Jill 00:39

Oh, that's so funny. "Great to know. Okay, thanks, Mom." [laughter] Oh gosh.

A little background: If you haven't joined us before, it's Dr. Jill Live, and we're on almost 90 episodes. You can find all the videos on my YouTube channel or anywhere you listen to podcasts and iTunes. I always have fun learning from my guests, and today will be no different.

Dr. Jill 01:02

I will introduce Kashif in just a moment. You can also find all of my blogs and resources at JillCarnahan.com. There are tons and tons of free resources there for you on mold, environmental toxicity, Lyme disease, and all the many illnesses that our patients deal with. They're all free. They're all there. At DrJillHealth.com, you can find my products and services there as well.

Dr. Jill 01:24

Let's dive in and let me introduce my guest today. I'm super excited about the opportunity for you guys to go deeper into your genetics. Often, what I find with patients—we'll look at environmental toxicity, infections, and all of that—is that the genes are the foundation and they really do make a difference in treatment protocols. So I do find this incredibly helpful. And more and more patients are being empowered to learn about this and to ask their doctors about it. And today, this is going to give you a great resource that you can access on your own and get more information [on].

Dr. Jill 01:56

Let me introduce my guest, Kashif Khan, Chief Executive Officer and founder of The DNA Company, where personalized medicine is being pioneered through unique insights into the human genome. What I love about what you guys do, which we'll talk about today, is that you make it really relevant and easy to understand. What I've found—I've been doing functional medicine for 20 years—even as a physician who understands this stuff, depending on how you report the data, it makes all the difference. And you guys have really made an effort to report the data in a way that's understandable and that makes practical applications. I'm super excited to talk about that.

Dr. Jill 02:35

With the largest study of its kind globally, The DNA Company has developed a functional approach to genomic interpretation, overlaying environment, nutrition, and lifestyle on the genetic blueprint to create personalized and deterministic health outcomes. It's like what we were just saying. Growing up in Vancouver, Canada, as an immigrant, Kashif developed an industrious entrepreneurial spirit from a young age. Prior to his tenure at The DNA Company, he advised a number of high-growth startups in a variety of industries, including luxury retail, technology, finance, fine arts, healthcare, tourism, and real estate. He participated in over \$3 million in revenue in his own retail business prior to launching consulting services to help others thrive. As Kashif dived into the field of functional genomics as the CEO of The DNA Company, it was revealed that his own neural wiring was actually genetically designed to be entrepreneurial.

Dr. Jill 03:25

How cool! I want to hear more about that. I want to hear about that. I have found that I have a gene they call the empathy gene. I don't know if you know anything about that, but there's one that relates to that.

Kashif Khan 03:35

We'll get into that.

Dr. Jill 03:36

Cool.

However, his genes also revealed a particular sensitivity to pollutants. I have that too. This inspired him to develop custom nutrient supplementation to enhance this poor detoxification pathway—like me, [so it applies to] both of us—to deal with pollutants and chemicals, reducing the risk of long-term illness.

Dr. Jill 03:54

This is so relevant because, as we spoke right before we got on live here in Superior, Louisville, we just got over December 30th—the largest wildfire disaster in the history of Colorado. It came through burning over a thousand homes and businesses. We've been directly affected. I've known wildfires are damaging, but they are probably more toxic than mold exposure as far as the amount of plastic, chemicals, toluene, and benzene. This is very relevant. What happens to someone like you or me is that we have issues with either the production of glutathione or whatever detoxification pathways [are involved], so we're more susceptible to the environmental impacts. And things like wildfires are happening more frequently.

Dr. Jill 04:37

Anyway, that's a whole other issue. But let me let you go. I want to hear first: How did you get into this? It sounds like you had some personal experience. Tell us how you really got into it.

Kashif Khan 04:47

Yes, I did. I was sick. I went through the thing that you said about data not being so useful unless it's interpreted properly. Really, data is dumb. It's a bunch of

information. Unless you know what question to ask, you're not going to get an insight, which is much more important data. That was my experience.

Kashif Khan 05:06

In my previous life, I was a PR and marketing firm owner. That's what I did. I'm in Toronto, Canada, right now. That's where our firm was run. We helped small, medium, and large companies grow. And I got sick. I'm 42 now. I was 35 or 36 at the time. I had eczema and psoriasis. I had migraines all the time. I had an acid reflux issue. I couldn't eat anything. I was depressed at least twice a month. All this stuff was being treated as separate, siloed health conditions with a doctor for this, a doctor for this, a pill for this, and a cream for this. I just kept going down that rabbit hole and finding more problems that I needed to fix. None of them were being resolved; they were all being maintained.

Kashif Khan 05:52

And you hear this story so much when somebody stumbles across functional medicine and their whole life changes and they understand the root cause. How you get to the root cause is through different paths. For me, it was through genetics. I understood that all of this stuff wasn't many different things that I happened to be subjected to. These were the results of my poor choices and what my genetics led to.

Kashif Khan 06:16

You talk about detox. Forget about the ability to detoxify. There are certain genes that I don't even have. There's something called a copy number variation. Forget about a variant or SNP, that we talk about. I'm literally missing the GSTT1 gene, which is the most important glutathione gene. I don't even have it. Meanwhile, my office was sitting a few floors above a manufacturing company, with pollutants, solder, and all sorts of stuff coming through the vent. And you wonder why I had migraines and my business partner had no issues. He used to drive me home [while I was] vomiting.

Dr. Jill 06:48

Wow! This is really interesting. I've mentioned this one other time, but I just found out. I've been interviewing my family members for the book I'm writing. My grandmother—I just found out this year—is 90 years old. Back when she was 15, her

father moved over to an auto dealership that he had bought and they had an auto body shop underneath—benzene, lead, and things. It's like what you were saying about your office. It's a liver toxicant. Her father died of liver cancer. Her mother died of liver failure. Her brother died of metastatic cancer. It was every single person in her family. She was able to get out because she was the oldest of the children. But it's the same thing: Her genetics, like mine, have some impaired detoxification.

Kashif Khan 07:28

What you said is so important because this one thing was the trigger point for me when I took the keys to our marketing company, handed them to the staff, and said: "Thank you. You own it now." I walked away and said, "I've got to build this thing." And what was it? It was exactly what you just said.

Kashif Khan 07:46

First of all, when I first looked at genetics, it also failed me. I didn't get much out of it. It's when I started to look at functional genomics—meaning let's first understand how the body works, what are the systems, pathways, and biochemistry that's going on, and then reverse engineer what genes instruct them as per the system, as per the map. It's not then what a doctor would say, "Well, you have a genetic propensity to liver disease in your family." That's what the answer would be. It's three out of three, so "it's in your genes."

Kashif Khan 08:17

They were not born with liver disease. They were born healthy, so they should be able to stay healthy. What they are born with genetically is the inability to deal with that glutathione pathway properly for which the end result is too much load on the liver, which equals liver disease. They weren't born with a propensity for disease. They were born with overworked hardware. This particular organ is struggling and struggling and struggling because you're making the wrong choices.

Kashif Khan 08:44

If you understand the systems and the core things that lead to good health [such as] hormones, detox, methylation, your anti-inflammatory system, your neurochemicals in your brain, and how you perceive things—for example, why I'm entrepreneurial—you then know what to focus on. And then all these spokes of

different diseases that come out of the central hub don't matter; you don't need to have any of them. And if you have them, stop treating them; reverse them, because you get to the root cause. That's what was the light bulb for me and all of a sudden, my eczema was gone and my psoriasis was gone. I haven't had a cold or flu in four years. I used to be in bed three times every winter season for ten days at a time because I just wasn't healthy. And that's all gone now.

Dr. Jill 09:21

Wow! It's fascinating and so true. And I've used your testing on myself and on patients, and it's profound to understand those pieces of the puzzle. There can be very small, little things that we find out that make all the difference in their health trajectory.

Kashif Khan 09:36

Right. And going back to what you said there about [being] easy to use—that was one of the very first things you said. I actually learned that. There's a company up here called Rogers, which is one of our big telecoms, like AT&T. Their chief digital officer was one of our patients. We used to do a highly hands-on executive process because we didn't know how to make it available to everybody. That was very expensive because our scientists would have to interpret the DNA, figure it out, and then build a plan, then work with you. He said: "What you have here can flip health care on its head. You just need to make it easy to use. That's my number one advice to you"—he's the chief digital officer of a multi-billion dollar company—"make it easy." That's what I then put my full focus on.

Kashif Khan 10:21

People don't care what their gene results are. They care [about] "Here's what's wrong, and here's how to fix it." That's it. "Here's your problem. I figured it out"—tell me quickly what's really going on—"and here's what I recommend that will fix it for you." The genes might inform that. Great—we know there's science to back it up. But I don't need to know this SNP, this version, and 20,000 letters [inaudible].

Kashif Khan 10:43

The same interpretation our scientists were doing when they would read all this raw data, our artificial intelligence platform, which we built, does that interpretation. The report the consumer looks at or the [one the] clinician [looks

at]—because it's also hard for clinicians to interpret—speaks to the condition. I don't need to know I have GSTT1 null, which I have. I need to know: You're at higher risk for liver disease. You're at higher risk for mold sensitivity. You're at higher risk for chemical sensitivity. Oh, by the way, here's why. Now I can take action. Now I can apply it. And that's what we did.

Dr. Jill [11:16](#)

I want to speak as a clinician too, because I have used dozens of genetic companies, some of them better than others. The big thing for us is that sometimes we'll get reports that, if we print them—they're electronic—are an inch thick. There's no way to go through that with a patient in a normal office visit. Even more so, with your doctor, if you do get these results. I especially know genetics really well. Even with complex tests, I can usually find the important stuff quickly for patients. But for many doctors, this is new to them. If you bring in a report that you've done, you're overwhelming them, sadly. They shouldn't be overwhelmed, but that's the way we are, because a lot is going on. You bring this huge report and it's completely overwhelming, and they don't know how to help you.

Dr. Jill [11:57](#)

What I love about your company is that you're going directly to the patients and empowering them. Granted, they can make changes on their own, but if they're working with a great functional or integrative doctor, this can enhance their visits too. And it helps a doctor like me make easy decisions on what to do next.

Kashif Khan [12:13](#)

Exactly. It's fast, easy, and to the point. We speak to the condition and it's actionable. When people think about genetics, they think, "I'm going to find out if I have an 80% chance of Alzheimer's." What does that give you other than anxiety for the next thirty years? That does not do anything for you. It's a tease toward a problem. What you need to know is: Why does Alzheimer's happen?

Dr. Jill [12:36](#)

Correct.

Kashif Khan [12:37](#)

What causes it? Why does Health Canada now call Alzheimer's type 3 diabetes? Very quietly. Your doctor probably doesn't even know that. But they rephrased it. They had to. It's so obvious. It's not about a gene for which we clinically tested 80% of people who had this gene variant and got Alzheimer's. You still can't tell me why. The why is the most important part. Once we get into the why, then you are looking at very different genes. Just like you said, liver versus detox. Liver is the outcome; detox is the root.

Kashif Khan 13:09

That's what we do. It's not about: "Hey, you've got an 80% chance of Alzheimer's." It's: Here are the choices you need to make for you to avoid it. Here are the choices that you need to make for you to 100% get it. And now the choice is yours as to which path to take.

Dr. Jill 13:24

I love that. Like you, I have a lot of detox genetics. I grew up on a farm with atrazine and chemicals and things. I got breast cancer at 25 years old. I had eczema and psoriasis. All those things are evidence of a poor detox pathway. Once I knew the underlying cause, I could go to nutrients, diet, and lifestyle.

Dr. Jill 13:44

What I love about your reports is that you guys have taken the science and put together pretty easy-to-implement interventions, depending on the genetics. Maybe give an example of a couple of genes you might see and then what an intervention would be. We've already talked about glutathione. You and I both have those.

Kashif Khan 14:03

You mentioned breast cancer. I think that's important to talk about. First of all, it's one of those big, scary things that every woman is worried about. You mentioned in the beginning that we'd done this large study where we sat in front of thousands of people. We've met all our patients and documented everything. I would say the biggest area that needs the most change is female hormone health. That's the area where the experience sucks so bad. That delta value between what you're told and what's possible—it's all this gray area. It's very black and white, if you understand it.

Kashif Khan 14:36

If we use that as an example, most women have heard of the BRCA gene. It's a scary four-letter word. If you ask a woman, "Do you want the BRCA gene?" she'll say no because she doesn't know what it means. It's not about a gene; it's about what version of it. But then you ask the question, "What does that gene do?" If you have a particular variant, it's a tumor suppressor; it's a repairman or repairwoman. It goes out and fixes problems. It doesn't cause cancer. But if you have cancer, if you have a tumor, it's meant to go to work and suppress it. If you have a not-so-good repair tool, it's not going to do such a good job of repairing.

Kashif Khan 15:15

The clinical answer is: "Oh, bad BRCA. You don't repair well. Go get a double mastectomy." That's "prevention." Or you can ask, "Why did the cancer happen in the first place?" I have a repairman who can't repair. How about if I don't break it?

Dr. Jill 15:30

Correct. I love that you're saying this because here's the question I get all the time... As a 25-year-old, I was the youngest diagnosed in 2001 in my medical school in Loyola, Chicago, which is a major medical center. At that time, 25 was unheard of to get breast cancer. Every single person [asked], "Oh, do you have the BRCA gene?" "No, I don't." And 80–90% of us as young women—these oddballs that are one in a million chances of us getting it at that age—don't have that gene because that's not the root cause. It's very relevant because a lot of people think that gene is the indicator. It's one thing, but it's after the fact. Like you said, the repair mechanism. For me, it was all about detox, chemicals, and hormone regulators. It's very relevant, especially to my story.

Kashif Khan 16:16

I'll give you an actual example that's probably related to your story. And like you said, BRCA is the thing that goes and fixes it; it doesn't cause it. By the way, at 25, that was unheard of. Well, it's also because the level of chemicals when you were 25 was also unheard of. One generation ago, it didn't look like that. Anybody can go google 'chemical usage of the United States over time' or 'historical' and they will see a chart that looks like this: [makes upward motion with arm and hand].

Dr. Jill 16:44

We're all swimming in toxic soup. That's the elephant in the room. I say it every

day—the toxic load is exponentially increasing. And since my diagnosis 20 years ago, there are [younger-aged individuals like] 16 and 23 [years old]. There are a lot of women younger than me. It's been way more common in the last decade.

Kashif Khan 17:00

Yes.

So now let's dive into the why—the most important part. You were exposed to an extreme load, but most women experience breast cancer in and around menopause. That's typically when it happens for the most part—not everybody, but for the most part. Now we're getting into why. When you look at the hormone cascade... And by the way, it's the same for men or women. Women do it monthly; men do it daily. What do you do? Progesterone turns into testosterone, which turns into estrogen, which then turns into an estrogen metabolite, and then you get rid of it. We have to ask three questions: What is your dominance? What does your hormone profile look like? Are you more androgenized, more testosterone, or more estrogenized, where you have a lot more estrogen? Or, are you somewhere in the middle? It's possible. There are different variations based on your genes.

Kashif Khan 17:48

Suppose, as an example, a woman's dominance is estrogen. She's highly estrogen dominant. If you put Kim Kardashian and Kendall Jenner together, it's Kim Kardashian. She's going to have big curves, beautiful hair, and beautiful skin. But she's going to have a whole other bunch of issues that come with it. Kendall is a thin supermodel, but she's probably going to have fertility issues, acne, hair problems, etc. Step one: Estrogen dominance. Step two: Before you clear that estrogen in your monthly cycle, you convert it into a metabolite—2, 4, or 16 hydroxyestrone. Two is great. You want that. It's clean and healthy. Four and sixteen are highly toxic—sixteen being more toxic than four.

Kashif Khan 18:29

Now suppose you're estrogen dominant and you're producing 16 α -Hydroxyestrone. Then you have a third step to see: How do you clear it? And it comes back to the same detox genes along with something called COMT, another clearance enzyme. How well do I get rid of this toxic stuff that I make every month? So now someone's

estrogen dominant, estrogen toxic, and doesn't clear well. They're still not sick. They're still not born with a problem.

Dr. Jill 18:55

And I want to mention quickly that hormones like estrogen are treated like drugs by our liver. People are like: "Oh, that's something I'm making. That's okay." No. If your liver is not working and if your detox is not working, these are extra drugs to your system because your body has to detoxify it. Even though your body makes it, if you don't have detox working, it's like a drug to your system.

Kashif Khan 19:17

Yes. It's like you're plugging the exit route and everything is getting clogged up at the exit route. Over time, it's going to reach that threshold, which is why it takes until menopause and why it takes that long. There are a couple of things that happen. You no longer have a menstrual cycle. "I don't clear well. My glutathione pathways and my detox pathways aren't that good. But at least I had a menstrual cycle where I was getting rid of most of it. Now I don't do that anymore."

Kashif Khan 19:45

Eighty-five percent of North American women will be on the birth control pill for an elongated period. It's part of the culture. That's more estrogen, more fuel to the fire, more metabolites, and more that needs to be cleared. When you no longer have that cycle when you're menopausal—and you may also be on hormone therapy because your doctor told you to—what happens is your body doesn't clear it because you don't have a cycle. Your body starts to store it in fatty tissue because it wants to keep it away from the organs. It wants to keep you safe. Where do you have fatty tissue? In your hips and your breasts. And what's in the breast that was never designed to deal with that level of toxic insult? All the sensitive glands—

Dr. Jill 20:23

All the hormone receptors.

Kashif Khan 20:27

This was not designed to deal with that. You were meant to not have 15 years of birth control pills. Your body never understood that that's what you were going to do to yourself. You weren't meant to have chemicals in every single way you go that are endocrine disruptors and mimic hormones that cause even more problems. You

weren't meant to be using a Teflon pan that is an endocrine disruptor. All these things that are a load take you from, "I might have a bad profile, but I'm still not sick"... Well, here's the load. That's why we say environment, nutrition, and lifestyle. What did you do with the cards you were dealt? For some women, it's not their fault. They just didn't know because we're not taught this—that the wrong things increase the estrogen load, [causing] more metabolites, more inflammation, and faster breast cancer. Then, after all that, BRCA should go to work and try to help you.

Dr. Jill [21:15](#)

I love, love, love this. What a lot of women don't realize, maybe those listening here know because they're talked about a lot... You mentioned endocrine disruptors. They are everywhere. The first thing I did the year after my cancer was [figure out]: Why did this happen? I went and looked at the chemicals. I looked at bath and beauty products. I looked at cleaning products. I looked at all the things in my home and that I put on my body. Many of them were endocrine disruptors. And then on the farm, I grew up with toxic organophosphates, atrazine, etc., and many, many herbicides and pesticides in my well water. You can see it happening.

Dr. Jill [21:49](#)

There are a lot of things in your environment that are contributing to an estrogen-like sensation in your body. Those chemicals look like estrogen to your cells. You have this load of excess estrogen in your body that you're not detoxifying, which you're making yourself. And then the chemicals you put on your face, phthalates and parabens, and organophosphates on your food if you're not eating organic, and then pesticides and herbicides—these things all add to that load. And that's what we're talking about.

Kashif Khan [22:14](#)

Yes. You have to understand that our DNA is 250,000 years old, meaning that's what we inherited. It started around the time that people started to look the way we look today. This blip in time, these two or maybe three generations of heavy chemical usage—all the stuff we're talking about here—we're talking about like 100–150 years versus 250,000 years of what we inherited. We were designed to do that [points to the latter]. Imagine how impactful it is on the system that was designed to do what those people did for 250,000 years until the last few hundred years. [Then] there

was industrialization, smog, pollution, etc., etc. It's such a new blip versus what we're designed to do that we just can't handle it; we're not designed for it.

Kashif Khan 23:01

This leads me to another thing. I'm going to focus again on women because I think it's so impactful and so important. Sixty-six percent of women who have a cardiovascular issue will die in that first instance. It's much more impactful for women. It's much more impactful. There's no previous warning sign, no pain, no nothing. Heart attack—boom. It's much lower for men because we don't also have that estrogen toxicity load, which is also causing that inflammatory issue, which leads to that cardiovascular disease. Why do you have that cardiovascular disease?

Kashif Khan 23:40

I'm brown. I'm a Middle Eastern mutt. I have a little bit of Pakistani, Indian, Turkish, and Afghani. There's a little bit of everything in me. I'm told that genetically, I have a bad heart and should expect to get diabetes and cardiovascular disease. Guess what? My dad had all of those things and he died when I was 17. My grandmother had them. My uncles had them. It's not because they have bad hearts; it's because their hearts were designed for what their ancestors did, who never had cardiovascular diseases until they moved here.

Dr. Jill 24:10

And the industrialized diet—the standard American diet—plus chemicals, plus all these things in our bodies [inaudible].

Kashif Khan 24:15

Exactly. If you inherit the genetic legacy of people who did not have cardiovascular diseases, what did you inherit? And this goes to speak to women: Why does the compound effect of hormones plus bad cardiovascular genetics equal a problem? So, 9p21 determines how robust the endothelial lining is. Heart disease typically doesn't happen in the heart. It's usually in the arteries—calcification, blockage, cholesterol, and all that stuff. That then leads to the heart not getting enough blood—a heart attack. The inner lining of that artery is called the endothelial.

Kashif Khan 24:49

There are different-quality versions. You can have a stainless steel endothelial and you see grandma smoking when she's 95 and never got sick. She probably has that. Then you also see the somewhat normal version, which isn't what you're supposed to have. You should have the stainless steel version. And then there's the paper-thin [version], prone to inflammation.

Kashif Khan 25:08

If you test those South Asian people who are told they have bad hearts—there's nothing wrong with the heart—they typically have poor quality endothelial linings. They just didn't need a good-quality [lining] because there was nothing causing inflammation. They also typically have poor detox pathways, like myself, because they didn't need it. Everything was organic and pure. There was nothing to detox. They didn't need it. They also have poor methylation or anti-inflammatory pathways because if there are no toxins, there's no inflammation. If there's no inflammation, what anti-inflammatory mechanism do you need? What are you fighting?

Kashif Khan 25:44

The whole methylation pathway is usually suboptimal. It's that perfect storm of then all of a sudden changing the environment, nutrition, and lifestyle and having the inflammatory loads and then causing damage—literally abrasions to this endothelial [lining]—then you start to get inflammation here for which you don't have the anti-inflammatory system to fight it. What does your body do? It deploys cholesterol as a hormone to reduce the inflammation. And when cholesterol meets toxicity, it hardens, it gets deposited, and then you get the beginnings of cholesterolemia.

Kashif Khan 26:16

Take that and compound it with a woman who has estrogen toxicity dominance and she's getting it from two fronts, which is why when you finally cross that threshold where you have the heart attack, it's hard to recover because it's so much more powerful and impactful for a woman. You've got to think about how, with heart disease, it's not the disease. The heart disease is [because] for 50 years, you did the wrong thing. You abused this organ like crazy and now it has given up.

Dr. Jill 26:42

Yes. I love this. It's so relevant to women.

I was just thinking; I didn't plan on doing this, but if we take just two minutes, I could share what my results were. I'm going to be really vulnerable. You obviously know what they look like. The reports might have been updated since I originally got them, but they're still beautiful and, I think, are very relevant. What I've noticed in the last couple of years is that the way you're reporting is continuing to [change], so forgive me if this is an older version. I'm going to share it now, though. You can see my screen. So let's talk about this. And I can go down.

Kashif Khan 27:14

These are our clinical reports. This is not what a consumer gets, and there's a very specific reason why: This requires interpretation. What does this map mean? This is your hormonal cascade. As we said, on the far left, you start with progesterone. In the middle, you convert that to testosterone, and then on the bottom, you drop down to estrogen. It seems that simple, but because of these red, green, and orange lights, there's different speeds at which these genes are operating [inaudible].

Dr. Jill 27:44

And I just want to say that was brilliant. This has been a couple of years now. Your reports are even better and they're much more consumer-friendly. But to me, this was so brilliant—the red, green, and yellow lights—because you can just glance at this and see: "Oh, those pathways are like red lights." It's so easy.

Kashif Khan 27:59

Yes. So, what do we know about you? First step: Your hormone pool is very low to begin with. You're not converting progesterone into testosterone. But the good news is—if you go up to the upper left—you're not clearing those androgens, those testosterone. You use them for a while, which is why, even if you look at yourself, you're more androgenized. You have the more chiseled [face], which women want—the beautiful elongated face or the chiseled body. That comes from holding onto this testosterone for a while. You don't—go across to the right—produce DHT.

Dr. Jill 28:31

Which is why I still have hair—lots of hair.

Kashif Khan 28:33

This is why. Exactly. Women who are suffering from acne, hair loss, PCOS—polycystic ovarian syndrome—it's all rooted in this DHT. And of the DHT you produce, there's a yellow light on the top right, which means you're getting rid of it at a medium-fast speed. It's really not a concern.

Dr. Jill 28:50

[inaudible] because this is really easy with the cancer, what you mentioned before. I'll just explain. Cytochromes are our liver's phase 1 ability to detoxify things. I love the way this is set up because we know 4-OH in the middle here is one of those DNA-damaging hormones from estrogen. And you can clearly see it. You can explain what's happening there.

Kashif Khan 29:10

Yes. Go down another page. This is the sample. Your results are, I think, on the next [page]. There you go. For you, there are red lights all the way across. What does that mean? Your conversion into the toxic stuff is very slow, which is good news. But from what I remember, your detox pathways aren't the best.

Dr. Jill 29:28

They're terrible.

Kashif Khan 29:30

This is why you have to look at things functionally.

Dr. Jill 29:32

Is that the sample and then this is mine? Yes, here we go.

Kashif Khan 29:34

Exactly, yes. This is why genetics isn't "This gene means this." Imagine if I only told you about one gene. "DHT—you're at less risk of toxic testosterone." "Okay, but what if I don't clear it well? What if I also produce estrogen metabolites?" You have to look at the full cascade, which means biochemistry, first. What does the body actually do? And then, what genes instruct each step? What we do know is that of the toxic metabolites that you do produce... Actually, in the GSTT family, you are clearing quite well. It's your SOD2 or your oxidative stress genes that aren't doing the best. And your COMT also isn't doing the best. That means you would probably

want support here. Even though you don't produce so much of the 4-hydroxy, you still want to do something to get ahead of the little that you have. Let's clear it. Let's supplement and let's do some things to get rid of it.

Kashif Khan 30:25

And where do you focus? SOD2 is a gene that determines how well you deal with clearance at the mitochondrial level, whereas GSTT1 is like the police force in the blood. It's going around binding to toxins, sending it to the liver to metabolize glutathione. GSTP1 is the first line of defense for the lungs. I breathe in mold, fumes, or whatever, and then I have these soldiers that are helping me here. This is right at the cell. SOD2 is in the middle here. Your cells take in oxygen and nutrition to create energy. They're all doing the same thing. In that process, they also create oxidants. Oxygen becomes an oxidant, which is toxic. You don't want that. Some people don't deal with that, including yourself, so well. If you get into oxidative stress, you're going to struggle more than another person, which means if you were to become a marathon runner, you're likely to develop more wrinkles and your hair is going to turn gray faster.

Dr. Jill 31:21

This is oxidative stress, which is the root cause of the damage to DNA. Interestingly, just a little side note: The hydrogen tablets and hydrogen breathing machine basically neutralize this. I found that to be a game-changer for me.

Kashif Khan 31:34

Exactly. So now you know where to focus.

Dr. Jill 31:36

Yes. Thanks for letting me go there. But I thought, "I want people to see how amazing this information is." And you've got way better reports than even those now. It's so clear and easy to see the red light and the green light. And now you've got some interpretation and a lot more information. Maybe you can even tell us what you've done since those reports.

Kashif Khan 31:56

Sure. We went through 7,000 people, one by one by one internally as clinical patients. As I said a while ago, people want to know: "What's wrong? How do I fix it?" Don't give me my encyclopedia of genes. I don't need a full genome

sequence—22,000 genes. Tell me what I need to work on. Tell me the five genes I need to work on. We broke that down into six things. If you go through these six, it resolves most human optimization. I want to prevent disease, slow aging down, and be at my optimal performance level. That's what everybody wants. And if you go through these six things, you get that.

Dr. Jill 32:36

One, cardiovascular. We talked about that—understanding the biggest killer in the world and why it really happens. Why does diabetes really happen? What do you do about it? The second is hormones. But in the hormone report that the consumer gets, we go more into applicable stuff like fitness and body type. If I want to put on muscle—

Dr. Jill 32:56

From my report, you might say, "Avoid smoking and do some moderate cardiovascular exercise." Maybe "try some sulforaphanes to help the estrogen." You would give real practical recommendations based on that, which is wonderful.

Kashif Khan 33:09

Specific recommendations, yes, that are based on the genome. Then we get into diet and nutrition. There are a lot of genetic tests out there that do nutrigenomics or tell you what to eat. We do it more at the biological level, meaning the macros. Are you a fat metabolizer? Are you insulin-resistant? Are you a starch metabolizer? How do you handle vitamin D? Of the 22,000 genes in your body, 2,000 require vitamin D to function. Literally, 10% of your body's biochemistry is dependent on this one hormone, which is what it actually is, in order to function properly. Vitamin D in your blood to go get a blood test is step one of three. Even if you have enough in your blood, it doesn't mean that you're doing genetic step two, which is transporting it to the cell where it's actually used. You could have plenty in the blood, but you never actually transport it, so you're not using it. You might not do step three, which is binding it at the cell and utilizing it. We have plenty of people who test fine at the doctor's [office], but they have mood issues every winter.

Dr. Jill 34:12

Let's talk about VDR. That's the receptor, right?

Kashif Khan 34:15

VDR, exactly.

Dr. Jill 34:15

I've got that one for sure. With the other receptor level, you need a higher dose to get the message across.

Kashif Khan 34:22

Exactly. The regular dose isn't enough for you. And if you're not a good transporter, you need multiple doses because you need to transport ten, but you only have two seats in the car. So then, all of a sudden, you need to do it multiple times. Understanding that one thing can completely change somebody's health because vitamin D is so important. Anyway, diet and nutrition.

Kashif Khan 34:43

Then we look at sleep because it's so important in terms of recovery and health. And this was something that we never even intended to do. Every time we helped somebody get healthy, sleep was a big part of it. We've understood that sleep isn't about, "Hey, I can't sleep." No, it's, "I can't fall asleep" or "I can't stay asleep." "I fall asleep just fine, but I wake up at 3:00 or 4:00 a.m. and I just can't get back to sleep." Or, "I sleep through the night, but I wake up feeling like crap. I didn't get good quality sleep." Genetically, these are three different things.

Kashif Khan 35:13

Then we look at mood and behavior—the neurochemicals of your brain. It's actually the biggest report. It's double the size of everything else. If I had your DNA, which I do, I wouldn't need to have ever spoken to you to understand your personality. Do you procrastinate? Are you irritable? How deep are we going to dive into this conversation? How curious are you going to be? Are you wired to be a clinician or not? That's all pre-written in your DNA. We understand how your genetics instruct neurochemicals, but we also understand what those neurochemicals equal in terms of traits—mood and behavior. I'll get into that using my example. You asked about entrepreneurialism, right?

Dr. Jill 35:56

The last thing is inflammation, detox, and immunity. It's core cellular health. How healthy are your cells and why? And what to do about it.

Kashif Khan 36:04

Going back to my mood and behavior. Let's take the dopamine pathway. Most people are familiar with that. Dopamine is your ability to feel reward or pleasure. It does two things. There's a gene called DRD2, which determines how dense your receptors are—your ability to bind that dopamine and use it and feel it. I have a very sparse, poor-quality receptor. I don't bind much. There's a gene called MAO, which is then responsible for breaking the dopamine up. Once it's bound, you need to get back to normal eventually, so MAO breaks it up.

Dr. Jill 36:39

There's another gene called COMT—the same one that we saw that clears the hormones. It also clears neurochemicals. I have slim to no dopamine receptors, so I don't feel much. I have the fastest possible MAO and the fastest possible COMT, so I feel it way down here and it lasts like that [snaps fingers]. I have three potential outcomes. I don't ever get the pleasure or reward and I get depressed, which I was, as I said, when I was working. Or I go down the pleasure route and I become addicted.

Kashif Khan 37:12

I found that the thing that gives me that dopamine hit that I don't get to experience is so satisfying that I have to keep doing it and doing it. Or I go down the reward route and achieve, which is where I unintentionally landed because I needed to. I was taking care of my mother and my sister because my father passed away. I had to take care of the family, so I started working. I unintentionally went down this reward route and whatever I did yesterday just wasn't good enough. In the business I'm doing, "I can do better." "I met this guy. He's not as smart as me. I can do better than him." And then reward, reward, reward, reward, reward. And that's why I walk away from a PR and marketing company to start a biotech company that I have no business doing.

Kashif Khan 37:53

With that one pathway, you can now layer other things on top of it. Serotonin. Serotonin is your mood regulator. What if you don't do such a good job there? I

have a somewhat dysregulated ability to cope and deal with serotonin. For me, all the details in the stimuli are slightly exaggerated. Not only am I pursuing reward, but I'm perceiving things a little more than they are meant to be perceived. In a meeting, when the clock is ticking, the food is being chewed, or whatever's going on, it bothers me.

Dr. Jill 38:29

And that could present as ADD for some people because you're distractable.

Kashif Khan 38:32

Yes. You're very easily distractable. And it's not that I'm distractable; I'm motivatable. That's not even a word. I just made it up.

Dr. Jill 38:40

I love it!

Kashif Khan 38:42

I get drawn to things. And I just have to focus—now that I know that—on the things that will keep me drawn towards my goal, whatever I'm trying to do. Every stimulus, whether positive or negative... It kind of looks like I'm bipolar. I can be bothered by something and irritated, but I'm very easily brought back up to laughing and joking if I'm stimulated in that direction. I just need to be pulled. I've just got to be careful when I'm being pulled.

Kashif Khan 39:04

But guess what? That same serotonin—going back to sleep and the thing we talked about. Why is it that some people fall asleep? And this is the biggest sleep problem that we found: It's not that people can't fall asleep or can't stay asleep; it's that they wake up in the middle of the night. Why is it? Melatonin and circadian rhythm are the two things that put you to sleep—your internal clock. And people do okay there. And there's enough melatonin supplements you can take that help you. What people don't understand is that melatonin is your go-to-sleep chemical; serotonin is your wake-up chemical.

Kashif Khan 39:36

You start making serotonin at that first light or those first stimuli. What if that first stimulus is your spouse pulling the blanket? Or it's getting too hot after three hours of sleeping. Or there's light leakage through the drapes and you wake up. I think a lot of your listeners know that sleep isn't eight hours straight. It's in cycles. You're in and out, in and out. Some people can do that. Some people wake up and can't get back to sleep because their bodies think they are finished. This was me. There were days where I'd wake up at 3:00 a.m. and start working. I wasn't okay. I was still tired. I just couldn't sleep. Now I know why.

Dr. Jill 40:15

Was the serotonin not broken down or was it excessively produced?

Kashif Khan 40:20

I have slightly shorter receptors. I don't bind enough, so the response to stimuli is exaggerated.

Dr. Jill 40:28

Yes. Just little things would wake you up.

Kashif Khan 40:34

[inaudible] and then your body thinks it's time to get up. And then you're in serotonin mode. The serotonin starts pumping, which it's not meant to do until you're ready to get up. And this is why we did what we did by meeting 7,000 people. It wasn't until we anecdotally asked them, "Tell us about this" or "Tell us about that" that we were able to collect all these insights. Data, like I said, is dumb. "Your serotonin isn't the best." What does that mean? You need to meet patients to find out what it means.

Dr. Jill 41:02

Exactly. I'm curious. I don't have my results right in front of me, but just from what you've said... I love dopamine. I think I produce a lot of it. I think I don't break it down, but I seek out adventurous things. Is that a pattern you see in genetics with dopamine?

Kashif Khan 41:18

This may have to do with the audience that comes to us, but we typically see one extreme or the other. We don't see much in the middle. What do we see? Me—the

addict and the reward seeker. We also see the maximum dopamine receptors. That person is the binger, meaning that because it's so easy for them to experience pleasure and reward, they really aren't bothered to pursue it. You go sit in a meeting with them. They're going to talk about ten things as a group, and next week comes by and they've done two of them. They never even started the eight [tasks] because they just don't care. But the two that they did—they will do it better than anybody because that's what caused them to experience that reward. And when you have high-density dopamine receptors, you stay in the reward [zone]. You get lost in it. You binge because it's so good to be in that, whether it's work, play, or whatever it is. The person who can watch eight Netflix episodes until 4:00 a.m. and just can't turn it off—that's the binger.

Dr. Jill 42:19

I'm guessing I'm more like you because I need motorcycle riding and rock climbing. I love those little [adventures]. But it probably goes away pretty quickly.

Kashif Khan 42:28

The little hits. And you need it structured. The binger just needs it when it happens. The addict needs it regularly. If I don't get to the gym, I am extremely frustrated.

Dr. Jill 42:38

Yes! Years ago, it was the same thing. I was addicted to exercise.

Kashif Khan 42:43

But the binger is like: "I don't need to go, but when I go, I'm going to go—I'm going to stay there for two hours, bro."

Dr. Jill 42:49

Wow. Interesting. This is fascinating. Again, I know a lot about genetics, but I'm learning some new things here too.

Kashif Khan 42:57

The last thing I was going to say about that is, imagine now knowing this about yourself and how personalized your protocols can be, meaning: "Go do this. Go do whatever you have to do." You have to first understand: How do you even perceive what "go do this" means? How are you going to handle those instructions [such as] "Take this medicine," "Do this exercise," "Go train your abs," or whatever it is? How

do you put that into practice, where you stick to it and don't fail? That starts with understanding how you think.

Dr. Jill 43:28

Fascinating. And it's so relevant for people to be able to access this. Do you have six or more different types of tests that can be ordered? Tell us about the actual categories.

Kashif Khan 43:41

In the one test, we provide all of what I've spoken of—the six [points]—[such as] sleep, cardiovascular, etc. We believe that this is what everybody needs. From there, if we want to get clinical—like if somebody says, "I have fibromyalgia" or "mold sensitivity"—and they want to dive deeper and fix a problem, we have coaches that are trained in genetics that can build a program with you. They can work with you for weeks on end. We even have an executive program, which is where we started. We first started off as a super-high ticket because that was the only way to do what we did. It was all hands-on, with expensive scientists. That still exists. Some people are like: "Take my genome and just renovate me. Just do everything." That still exists.

Kashif Khan 44:26

But for the most part, if you have the reports in front of you, it's actionable and it's easy—you know where to focus, and you know what to do about it. But if there's an actual problem you're trying to solve—"I need to lose 10 pounds," "I need to get rid of my fibromyalgia," or "I have a fertility issue"—that's where I would highly recommend getting on board with a coach to implement the behavior changes. That's the biggest challenge for people—to stick to what's being told and not have the reports in a drawer somewhere and then go on to the next test.

Dr. Jill 44:56

Fascinating. Oh my gosh, this is great. I knew a lot about your company, but I learned some things today. Like I said, I love the accessibility. I love the legibility—the ability for people to take what they're looking at and implement it—and the fact that you have coaches. You've really done an amazing job developing the company to make it applicable. If you're listening here on Facebook, on YouTube, or wherever you're listening, we'll make sure to provide a link. If you want to order, you can directly contact the company. I'm going to put a link there

for that. What else is on the horizon? Is there anything else coming out or that you're working on for the future?

Kashif Khan 45:29

We are a research company at heart. That's what we truly do. We know that we have to allow people access so we've built reports and we've built the artificial intelligence program. People can get into it. But we never stop researching and learning. I would say the two areas where my focus is the most—what are the next steps? It's female hormone health, like I said. I think giving a report is not enough. I think we need a second medical system that works alongside this one that was built on studying men. Seventy percent of Alzheimer's patients are women, yet seventy percent of the research dollars are spent on men. How does that make any sense? And that's why seventy percent of women aren't being helped. The next thing we're doing is building that female hormone business. It's not just about a report, but let us clinically help you as a telemedicine clinic.

Kashif Khan 46:22

The second thing we're doing is saying that anytime you're talking about prevention, the best thing you can do is start early. If I can give you: "Here's your instruction manual. I've decoded your genetics. Here's what all your instructions are telling all your cells to do. By the way, I can see this in 10 years, this in 20 years, and this in 6 years." Wouldn't you want that information when you were five years old? So the second thing we're working on is reinterpreting all of what we know for kids. Why? Because the place I use this most in our house is for my kids. How do I teach this kid versus this kid? How do I discipline this kid versus this kid? Why is it that when I come and yell and say, "Why did this happen?" one kid does it again five minutes later and the next kid can't look at me for two days? That goes back to the empathy genes you're talking about and the ability to imprint negative stimuli, PTSD, or trauma. Some people will burn that thing into them and for some people, it's as if it didn't even happen.

Dr. Jill 47:26

Wow, fascinating! That explains a lot of my childhood. [laughter]

Kashif Khan 47:30

Yes. So imagine knowing that about your kids. And everything else [such as] body development—"Should they be a linebacker?" "Should they be a ballerina?"—and all that focused stuff, [like], "What does my kid actually need?" to me, that's the biggest passion project we have because I've seen the impact in our own kids.

Dr. Jill 47:44

Yes, in your own family.

Kashif Khan 47:45

And that's what we're doing. But to get the reports, where do we start? I would even suggest that instead of going to our website, people should go to the landing page that we have with you. Why? Because they'll get extra stuff. Our website is where people go, by the way. Our website is where the world goes to buy. I know that a lot of your audience is focused on environmental health issues, mold issues, etc. We actually built a guide for mold and environmental health, which we're going to tack on to the report. It's not a product you can buy. It doesn't exist on our website. It's just going to help people navigate the report for that specific issue. And it's the one area where, even if you don't think you have an environmental health problem, you probably do.

Dr. Jill 48:29

Exactly. You and I are perfect examples of that. This link will be there, but it's easy to tell you, so write this down. Go there and get the reports. It's DrJill.DNA.clinic. I would love for you to go there. You can order it directly and get your reports.

Dr. Jill 48:56

And thank you for doing this. This is one of the reasons I love collaborating—because you guys are so cutting-edge at giving tools that we can empower our patients and our listeners.

Kashif Khan 49:05

Yes, that's awesome.

And the reason I'm urging people to go through that link is because we want to know who wants that extra document. Otherwise, it's not a thing that you can buy

or it's not for sale. But anyone who comes through there will know that that's why you came, so we'll give you that extra guidebook.

Dr. Jill 49:21

Yes. Thank you because you empower me to help more people and patients. And this is something you can order. You don't need me to [place an] order. You don't need to see me in the clinic. You can actually do something about your own health, get the report yourself, and start working on that. And you guys have coaches, so if you do want some help, The DNA Company will also support you in those other things that you potentially need.

Kashif Khan 49:39

We're here to support whatever people need. And everybody needs [something] a little different, from just curiosity to already being optimized and just trying to find that next thing to work on to "Hey, I have a clinical representation of something and I just need some more advice beyond what my doctor's saying." All of the above.

Dr. Jill 49:56

Awesome. Thank you. Thank you for your time today and for the great information. We will be sharing these links for everybody. And thanks again for your time.

Kashif Khan 50:06

It was a pleasure. It's awesome talking to you every time.