Episode 116 Transcript

Dr. Jaclyn Smeaton

Welcome to the DUTCH Podcast where we dive deep into the science of hormones, wellness, and personalized healthcare. I'm Dr. Jaclyn Smeaton, Chief Medical Officer at DUTCH. Join us every Tuesday as we bring you expert insights, cutting edge research, and practical tips to help you take control of your health from the inside out. Whether you're a healthcare professional or simply looking to optimize your own wellbeing, we've got you covered. The contents of this podcast are for educational and informational purposes only.

The information is not to be interpreted as or mistaken for medical advice. Consult your healthcare provider for medical advice, diagnosis or treatment. Hi, and welcome to this week's episode of the Dutch podcast. I'm so excited for this week's episode because what we're going to be talking about is a critical underpinning for all health and hormonal conditions. And that's environmental toxicity. Now, when we think about a patient's toxic load, what I learned from this conversation is that really this is a problem for all of us.

It's just a matter of how heavy of a burden we have. And the problem is that it's getting worse and worse and worse. You probably hear about this, more cancer, more autoimmunity, more degenerative neurological conditions, Parkinson's and dementia, more allergies, more problems with people in their immune balance. And a lot of this is coming down to understanding our overall toxic load. Now today's guest is an absolute expert on this topic. She's gone through personal health transformations with both cancer and autoimmunity with an incredibly inspiring story. But she's really transformed that into a real passion for being one of the leading experts to be able to help others on their journey. And really, I think the biggest takeaway from the pod today is that it's a really hopeful story for all of us. There's a lot of simple things that we can do. And Dr. Carnahan really shares with us what you can be doing to understand your toxic load, but most importantly, to make improvements for yourself and for your family. I think you're going to love this episode. My guest today is Dr. Jill Carnahan. She's a board certified physician in both family medicine and integrative and holistic medicine with a special focus on complex chronic illness. She's the founder and medical director of Flatiron functional medicine in Colorado, where she blends the latest in functional and conventional medicine to uncover root causes and restore health. I mentioned she's a breast cancer survivor, also a Crohn's disease survivor, and she brings her personal experience and deep compassion to patient care.

She's also an international speaker and author of Unexpected, Finding Resilience Through

Functional Medicine, Science and Faith. So without further ado, let's go ahead and get started. So Dr. Karian, it's so nice to have you today on the DUTCH Podcast. Thank you so much for joining me.

Dr. Jill Carnahan:

You're welcome, always a treasure.

Dr. Jaclyn Smeaton:

So I wanted to really start because you have a very epic personal story that's really been transformative for you in pursuing this kind of integrative and functional approach. I'm hoping you can share a bit about your backstory. Like what experiences led you to explore the connection between environmental toxins, hormonal health, and how that really shapes the way that you work with patients today. This is foundational to people really understanding everything they were going to talk about.

Dr. Jill Carnahan

It so is and why I always get so excited talking about hormones. I grew up on a farm in central Illinois, one of five children and you would think it's the most perfect environment in the world. I a beautiful family, lots of acreage to run around and play and we had a garden that was organic produce and just this wonderful life. But it wasn't until I went to medical school and in my third year of medical school I found a lump in my breast, which many people know it turned out to be aggressive breast cancer at 25 years old. And I was at Loyola University Stritch School of Medicine and literally at that time in 2001, I was the youngest one they had ever diagnosed.

Now sadly since that time, of course, there's been lots and lots of young women So it's not as uncommon at that time, but that led me on this journey I mean I already was interested in holistic medicine I grew up on very my mother was a nurse who retired to take care of his children So we had this idea that you food is medicine and so even though I went to allopathic medical school I definitely had a bend towards Holistic healing and integrative medicine but that bout with breast cancer really transformed me in another level because I started asking the question that I think all

Doctors should ask and that's why you know why did this happen and what led me that led me on this journey to really discover how the environmental toxic load for me growing up on a farm with endocrine disruptors so things that actually affect our immune system and

affect our endocrine system and hormonal system at very low levels It's called a hormetic effect So that's classical toxicologist talks about these chemicals at the median range of which they create a toxic effect on the average human These are very very much lower levels when it's an endocrine disruptor because they're hormetic

which means this very, very tiny dose. So all that to say myself at 25 and then later my younger sister who is seven years younger, when she was 27 developed thyroid cancer. So clearly there's a environmental piece, there's a genetic piece, there's multiple pieces here that two young girls in their 20s developed cancer in this environment. And like I said, then that really led me down the path of what we're gonna talk about today and that is how does our environment

impact the expression of hormones in our body and put us at increased risk for autoimmunity, cancer, both of which I've had, and even things like neurodegenerative diseases.

Dr. Jill Carnahan (05:24.778)
It's such an important topic to talk about. And I'm really glad we have you on today with your expertise to really hone in on this because it's something that we see, you know, these are hormone actors, they're hormone like actors. They bind to hormone receptors. have activity much like a hormone can. And I think people still think it's conspiracy theory in some circles, right? So can you start by just breaking down how these everyday toxins, things like pesticides, plastics, heavy metals, how do they mess with our hormones and end up causing

you know, all of these downstream problems with immunity, right, and cancer, things like that.

Yes, I think it was like 15 years ago when, gosh, I can't remember the name of the original researcher who said the term or coined the term endocrine disruptor. But it's a really profound shift in our thinking because all of a sudden, like I said, it's really kind of important to know a classical chemical that's in the environment might be listed in their papers on the chemical of this is the average dose that might hurt the average person. But what we find in things like phthalates, parabens, and especially organophosphates are things that are used on crops, herbicides, pesticides,

And especially for me, I was particularly interested in the chemical atrazine. I'll tell you a short story about that in just a second, but all of these chemicals basically have a different

effect at very low levels that are hormone-like. And it makes sense because we think about how we measure estrogen, right? It's like nanograms. It's these tiny, tiny, tiny particles. In fact, you have to have a really good test company to be able to actually assess these accurately. So it makes sense that because in our own bodies, our own hormones act...

profoundly at a very low level. Most people don't know that women's testosterone are literally grades higher than their estrogen.

Dr. Jaclyn Smeaton (07:04.462)
It's tiny level, right? But the estrogen has such a massive effect on a woman and too much in a man will as well. So what happens is these environmental chemicals are acting in a hormetic way so that our body thinks there's this extra hormone and it can increase risk of breast cancer in women and prostate cancer in men and all kinds of other disruptions like irregular cycles, the rise in infertility. So I think at the forefront of functional medicine, we really need to be thinking about not only assessing our patients hormones and optimizing them, but think

about what else in the environment is acting on that body. Now real quickly, I told you I mentioned atrazine. So five years after my diagnosis, I was still in the like, why did this happen, doing the research? And I had remembered the work on Tyrone Hayes and Silent Spring. There's been lots of work on atrazine specifically because they've seen the studies where there's runoff and there's literally frogs and... Yes, literally have no normal genitalia because of this.

for today.

Dr. Jaclyn Smeaton (08:02.946)
So I was like, wait, this is an endocrine disruptor. And then I started looking and I looked in Illinois and in US of like where it's used. And the map that came up, this is a few years after my diagnosis was like shocking to me because right in the smack dab in the center of Illinois where I grew up was the highest use in the US. And then I went further to find out that in the European Union, the year I was diagnosed, 2001, it was banned. So now over 20 years, Europe does not use atrazine. I literally called my dad, he's a farmer, right? I said, dad.

Do we still use atrazine in Illinois? Any kind of size? And like, yeah, Jill, it's used on the classical cornfields in Illinois and it's still used. And that was 15 years ago. Literally today when we're recording this, it's still being used. It's a tragedy. It's unbelievable. Yeah, that

bigger frame is that these chemicals aren't regulated. We think we're safe. We think, my gosh, well, if atrazine is used, it should be safe. And then get this, this has been so interesting because I knew 2006 when I was doing this research,

Five years after my diagnosis, you know, there's probably a connection, but I couldn't find the literature because there was no papers correlating. Just 2023, I've started presenting this, there came out a paper, breast cancer linked to atrazine. So now it's actually published, my theory that was way before the data came out, but it makes sense, doesn't it?

I mean, it's really interesting and I want to double click on this because you made right away the differentiation between a toxin really and the way that these endocrine disruptors act because actually you really like the light bulbs kind of come on that

The defense against these compounds is no, we've tested them and they're not toxic at those levels that are used. They're safe at these levels. They're not toxic. Can you again just maybe differentiate, like, what's the mindset of like the EPA with these compounds and where those safe levels are set and what you're talking about here, which is like, you know, within the safe limits, there are negative human consequences.

Dr. Jaclyn Smeaton (09:58.188)
Yes, and so great that you went right to the heart of the matter because that's it really. There's this thing called a biphasic curve and they've talked about it, the endocrine disruptor scientist, because what the classical toxicologists say is the toxic level, this chemical is at say, I'm just gonna randomly say a number, say a thousand whatever units, right? What we find though is maybe at 10 units that has an endocrine disrupting effect. So no one's talking about not only the low level.

But the synergy between chemicals which can combine, like for example, Roundup is way more toxic than glyphosate. We talk all day long about glyphosate, but the truth is when we put it with these...

actually other chemicals that act as detergents, it becomes way more toxic. And then the new product that just came out is supposed to be less toxic. It's actually a thousand times more toxic than the original. And these are all similar in the sense of how they interact. One more thing important, especially related to glyphosate, which is another chemical used on farms, is often we think about these effect on human cells. the scientists will say, well, there's no effect on human cells. But what can happen is they can also disrupt the

microbiome, which affects hormone.

production as well, and things like glyphosate and Roundup actually affect the microbiome way more than our cells, but they can cause things like lymphoma because it's so disruptive on that level.

So when we think about hormones that get disrupted with these endocrine disruptors, my brain always goes to estrogen. Maybe that's where we have the most research or we know that there is estrogen-like compounds. Are there other hormones that we know are impacted by environmental chemicals in the same way?

Dr. Jaclyn Smeaton (11:32.246)
Yeah, well, it's so funny because like literally in my mind, I'm picturing the Dutch cascade because that's how we look at chemicals, We have quinolone and progesterone and all these pathways. The biggest thing that happens not only with toxic chemicals like endocrine disruptors, but also things like mold, toxicity in the environment, is this enzyme called aromatase, which I'm sure you're well familiar with and many of your listeners is upregulated. So for both men and women, that will steal from our testosterone and make more estrogen. And I would say in general,

even though there are other effects, what happens is that whole pathway, number one, lowers testosterone. The whole pathway on the HPA axis may lower cortisol or initially raise it and then lower it, which then affects DHEA and production of progesterone. But really what's happening is we're modulating the enzymatic transitions between hormones. So we're shifting things. for example, like men or women who have an endocrine disruptor that's causing aromatase arboriculation.

Women will have heavy painful periods, development of fibroids, more risk of breast cancer, all of the estrogen dominance kinds of symptoms, and they'll have lower testosterone. So lower libido, they'll have lower strength, less muscle mass. And then men, it's a tragedy because those kinds of things, when they get lower testosterone, higher estrogen, actually increase risk of cardiovascular disease and things that are way beyond metabolic syndrome, that are way beyond just the hormonal effect.

It's amazing. actually am thinking about, you're making me think of the work of Joe Pezzorno. I'm not sure if you're familiar with the stuff he's done, but he's really done similar research on environmental chemicals, but focused on metabolic health, really cardiovascular disease, type two diabetes. And he's found similarly that when you see men

with cardiovascular disease, typically they have the highest toxicity level in that he's done programs in the corporate space where he's treated those people through detoxification strategies and had incredible results with resolution.

And it really, it comes down to the heart of it, which is root cause. And in his estimation, I know he said that environmental chemicals and disruptors are more impactful when it comes to development of those diseases than even diet and lifestyle, which is incredible.

Dr. Jaclyn Smeaton (13:40.91)
I would completely agree. I would completely agree because while we know like exercise, the data on aerobic exercise is so profound as far as prevention diabetes, heart disease, pretty much all cause mortality is reduced by a high VO2 max in aerobic exercise capacity. However,

you can't really out exercise a toxic load, right? I mean, you're going to eliminate some of it through the sweat, but I've gone with some exercise physiologists and trainers I know head to head and said, yes, but we know the data, but if you have someone with their bucket, which is their toxic load all the way full and spilling over the top, no amount of exercise is going to take away that toxic load completely. So you have to have both and.

And well, truthfully, when you look at even aerobic exercise, what's the root cause of the improvement? Is it the exercise or is it the sweating, which is a means to detoxify as a result of it? I mean, it's really interesting to be thinking about there. So what are some of the symptoms that come up or like the early signs for people that might signal to them that they should be thinking about toxic load? I mean, probably just everybody should. But how do you estimate that with a patient?

Yeah, so couple things that I know you have lot of clinicians listening to. I think when we talk environmental toxic load and toxicity, it can get pretty depressing because the truth is we are all swimming in toxic soup. It is not going anywhere. it's hard to It is. It's really hard to avoid. And many of these things are persistent organic pollutants or things that we don't even know how to calculate the half life. For example, PFAAO's, which are polyfluorinated compounds in my state of Colorado, they've tested water supplies, including drinking water and pretty much all major water sources have.

avoid.

Dr. Jaclyn Smeaton (15:15.792)

some contamination and this is forever chemicals which means for our children, grandchildren and beyond, it's gonna be there. So because of that, we have this kind of depressive effect of like, oh my gosh, this toxic load, what do we do? And I always like to frame it with, well, there are some really simple things that we can do but the awareness is so important because if you're just going about your life and getting fast food twice a week and not really deliberately thinking about this, you're behind the eight ball and you will suffer.

consequences. There's no question in my mind, zero. And so when you ask about a patient walking into my office compared to 20 years ago when I might test toxic load, I will still test, but I know that we're toxic. I know that everyone walking in has toxic load. But back to kind of the more happy part and not the depressing part, because I love to give solutions and I've come up with something I say on most of my interviews and that's clean air, clean water, clean food, because that's very accessible whether you have a functional medicine doctor or not, if you're just a general person.

You can start with those things and you have to be deliberately thinking about, I breathe clean air? 80 % of our environmental toxic load is from the air that we breathe. That shocks people.

know that 80 % that is surprising. I would think food would have a bigger impact in water.

You would think, and just for example, mold, which can be inhaled or ingested. Let's talk about that, because that's why it's so, so if you ingest peanuts that are really moldy or a grain that got really moldy, your liver actually, goes through the gut, it has to be absorbed into the bloodstream, and then your liver is your filter, right? So that first pass metabolism takes away ton of the toxicity, and then what's left might still be in the blood or in your tissues or lipophilic in your, you know, stored. But think about when you inhale a small mycotoxin, it is 2.5 microns or smaller in the air that you breathe, it's invisible, you don't know it.

Dr. Jaclyn Smeaton (16:59.104)
and that alveoli can't filter that. So it goes directly 100 % into the bloodstream. So within seconds of breathing air in a water damaged building where there's mycotoxins present, that is in your bloodstream and if you're sensitive, you'll have symptoms right away. And then it goes to be stored in your tissues. So the truth is inhalation as a source of toxicity is way more toxic because we don't have the liver first pass.

to protect us. So yeah, that cleaner. And then what do you do? Well, you wanna make sure if your furnace filter has an air filter, get the highest MIRV rating you can do. Put a reminder on your phone to change those out every three months. You might have the higher the MIRV rating, you might have to pay a little more for the electricity to push the air through, but it's by far worth it. And then I have standalone filters in my house, in my condo, in my office.

and you want something with a good HEPA filter and also a good VOC, because that's the small particulate that I talked about, smoke, formaldehyde, nanoparticulate from exhaust and microtoxins. You want to have both in your filter. And just that alone will decrease your burden. And many, many, many people in their indoor environments are breathing toxic air.

I think about that lot because I always worked in the field of fertility and you have patients coming in with struggling fertility, you want to look at toxic load and the air is such an important piece to be looking at when you're cleaning that up. When it comes to looking at those additional filters, mean the price can really vary from a couple hundred dollars to several thousand dollars. Can you, I'm just, you might not have the expertise but I'm sure people are gonna ask like how do I know to find a good one? Is it worth the additional investment to get

you know, Austin Air or like some of the brands that are more.

Dr. Jaclyn Smeaton (18:41.454)
So a couple of things here. So HEPA is the classic filtration that's particulate and that most any good filter will have a HEPA filtration and the better the filter inside the more like particulate can be filtered. So that's like your spores and your dust mites and your things that are sometimes even visible, right?

Dog dander, things like Yes, yeah, dander, all that.

and that is like classical, you need that, that's gonna be your furnace filter. But then what I mentioned is some of these filters like IQ Air, Austin Air, Air Doctor, and there's others have a VOC, volatile organic compound.

This is like smoke from aldehyde, they're fumes and so a classic HEPA filter will not filter the fumes so I'm a big fan of getting something with both. How you would know that is typically it has a core that is carbon zeolite or some sort, it's almost like the binders we use for our gut right? Same kind of idea and technology is there's a carbon core in that filter that pulls in those particulate that will decrease. Now you can actually get a handheld little

meter. I have one, I travel with it and it goes on my phone and I can check the air quality and I can

and particulate matter 10, 2.5, 1.0, and VOCs. Now typically, there's some technology I just found in Europe, I don't know how accurate it is, but typically VOCs, volatile organic compounds, we can't tell for sure if they're from like off-gassing of a cabinet or microbial growth in the walls. We call those microbial VOCs versus like formaldehyde from a cabinet. But you can measure on your little handheld meter if there is VOCs in your environment.

Dr. Jaclyn Smeaton (20:09.036)
And just for example, when we had the wildfires here, I was testing it and I was shocked. Like the outer air was so toxic. The VOCs were like in the thousands when that air was, you know, and so people weren't even thinking about, mean, granted, they weren't hopefully running in that smoke filled room. But I saw lab values and things change as if someone was in a super toxic moldy environment just from the outdoor air, you know, in the month around the wildfires.

Where you would imagine it would be more like particulate matter. Right. Right. Larger compounds in the air.

It was the real, and that's what's happening, those really small things, kind of, we don't see them, we don't really know they're there, we may feel a little bit of burning in our chest or something, but they're pretty invisible and they're super toxic because our alveoli can't filter them.

That's really fascinating. the air, obviously, huge piece of air. Can we talk a little bit about water?

Yeah, so clean air, clean water, water's huge. And again, we take it for granted, but you need to be drinking filtered water. I just have been testing people and some of are like, tap water, city water, whatever. In my local communities, I have had them bring in the reports and sometimes I'll find, not uncommonly, way above normal level of some toxic compound. And they're not even talking about that. The city water just ignores it. Like it's shocking to me.

Dr. Jill Carnahan (21:22.094)
They even test for lot of the compounds, like they're not testing for like atrazine glyphosate. They're only testing for a small panel.

Correct, correct, correct. And even in a small panel, sometimes I'm like, like per chlorate. In a community not too far from Boulder here, I found a lot of that and my patients were testing high for per chlorate. I'm like, it's in your drinking water. So all I've to say, you must filter your water. And it can be as simple, I'm in a condo, so it's hard to install a whole house filter unless I have a house. So I have a fridge filter. It's very simple. It is not expensive, but it is one of the best things. I don't do any cooking or drinking unless I'm using that water. You can get some of those standalone filters in your kitchen.

If you have a home and can install a reverse osmosis or a whole house filter, that's even better because of course, bathing in this and showering in this isn't great either. But the reverse osmosis takes out the minerals. So you do need to make sure you're getting a mineral supplement or a mineral, some form of that so that you're not depleted because a reverse osmosis filter will give you a very acidic product like an acidic water and that's not great for bones. So it's kind of like this.

And then plastic water bottles. I mean, we've all heard now microplastics, that's another endocrine disruptor that is just shockingly becoming common. I'm sure your listeners have heard that we all have credit card size of plastic that is in our brains, which is insane. But really avoiding plastic water bottles and even the cleaner plastics, think plastic in general is plastic is plastic. So even BPA free ideally should be avoided.

Yeah, I always tell people the story where like when we, when everything, when everyone realized BPA was a problem and everything became BPA free, they were typically utilizing BPS, which turned out to be even worse than BPA. And that's the way you need to think about it is like, if you identify one compound that's a problem and you eliminate it, but you don't remove the category, you're probably not making the same impact that you need.

Dr. Jaclyn Smeaton (23:12.92)
Totally agree, yeah. And again, these things are just, they're not convenient, right? We're used to convenience.

And I think that's what's taking us down the wrong path. So you have to be a little bit deliberate about, I'm gonna put a whole house filter my thing, or I'm gonna get an air filter my house, or the things that we do. So that's clean air, clean water, clean food. This could be a whole lecture, but the bottom line is just really getting back to whole food, real food. And I would rather have you go to your local farmer's market and get food that's not certified organic, but they don't use chemicals, than to ship it from California two weeks in

a truck, the organic blueberries that look perfect.

We are so used to perfection, right? We have this image of the world that the blueberries are all the same exact size and the apples are all these huge, engorged with sugar kind of things that are monstrous. The chicken breast, right? That's not normal. If you go to a real farm, you have eggs of 20 different colors. You have apples that are a little tiny, but they're so sweet. And I'm like, let's get back to real food that isn't perfect. And however that looks to you, if you're local, if you grow it yourself, if you go to the farmer's market.

If we can get engaged with our communities and as much as possible, if you can get an H, what they call CSAs where they deliver the local, that's even better. But any way that you can engage in the land, because as me growing up on a farm, over the years, I used to say autoimmune disease begins in the gut, which is a, you know, environmental toxic thing. Now I'm like, no, it starts in the soils. So we need to be like thinking about farms, thinking about farmers, thinking about where we get our food and not be so stuck on perfection.

because it's such a disservice to our health.

Dr. Jill Carnahan (24:45.792)
I love that suggestion, and I've never heard that before, but I think you're so right, the focusing on the diversity, it's okay if it doesn't look perfect, and really focusing on the farm and the soil health. When it comes to food, I often hear the pushback of like, it's way too expensive to buy organic. Can you speak to that a little bit? Like how do you guide patients to make the decisions that are gonna be most impactful if they're on a budget?

I would love to because guess what? It's expensive if you want convenient. That's all it is. We want it pre-packaged, cut up, prepared. Like you think about most of vegetables now, not too many people buy these bulk big heads of lettuce and cut it themselves. They're buying it cut up, prepared, pre-washed in a thing and it costs more because it's easy, right? Same as, so say you go to the real farmer's market. I come home with dirty bunches of stuff that is totally, and I spend two hours

washing, cutting, trimming, getting rid of all the whatever. And then sometimes I'll use the carrot tops for a salad and figuring out what I can do with this vegetable. I don't even know what it is, but those things are inconvenient. And so we pay for time. So the truth is if you buy Bok rice and beans and you buy Bok from your CSA, you will save money over the typical Whole Foods or Alfalfas or whatever sprouts you name the market.

you're going to save money, but it's not going to be convenient. And we have to get used to being inconvenient in order to save our health and the health of our children really too.

Well, it's like you're going to invest on the back end with health care or you're going to invest time and money on the front end with preparation and really making sure. That's really, really interesting.

Dr. Jill Carnahan (26:26.136)
We'll be right back with more.

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providers already making a difference. Visit Dutchtest.com today. We're back with the Dutch podcast. So I want to talk a little bit about mold because that's an area that I've just seen growing in the functional medicine and integrative medicine space in the last maybe five years, the awareness around mold toxicity and

Now I think there's some kind of established protocols and we've gone through the trial and error period. We know a little bit more. Can you just start at the top with that? Like how did we start to pay more attention to mold and why and where are we at now with evaluation and kind of management? How big of a problem is it for all of us?

Yeah, gosh, it's shocking and it's increasing because people are suffering more than they used to. And I can tell you kind of the reasons behind that. My story began, got through breast cancer and Crohn's and all healed and doing well. And then in my workplace, in my office in Boulder, after this massive flood in 2013, a place that was already kind of borderline developed mold in my basement of my office and I got really sick. So once again, I was like, okay, I have to figure this out. And I had Stachypoptres, which is a really nasty black mold growing in the basement in the crawl space under my office.

Dr. Jaclyn Smeaton (28:06.736)
I literally had to leave and not everybody has to leave everything, but in that office, I left it, left all my books, started over. And that began my journey to be the mold expert and realize,

wow, this is really this hidden thing and affecting more people than we know. So what happens with mold is typically it's invisible behind a wall in a space. And I would say 95 % of patients, it's not like they're seeing a massive growth of black mold on their wall.

Most of them, you say, say I see the signs and symptoms like new onset of autoimmunity in a new environment or brain fog or fatigue that doesn't make sense or urinary mycotoxins positive, and I ask them, do you have mold in your home? Most of them say no, right? They have no clue.

So the key is thinking about where could we have water intrusion in this envelope of a building? So could it be that we had a dishwasher leak and we cleaned it up, but there was still water under the floor that never got cleaned up? Could we have a fridge line that leaked? I've had tons of people who are like, well, I have a new house, there can't be mold. And that is so false. I've seen multiple cases where the person who's installing the cabinets drills right through a pipe in the kitchen. No one ever knows until eight years later when there's a massive black mold in the wall behind the cabinets from that leak over time.

and things like bathtubs you spill over. Or I've seen lots of contractors that don't put a proper vapor barrier in the seat of the shower or behind the grout and there's leakage from that grout, which is actually porous. People don't know that grout is porous. So if you don't have a vapor barrier, then it goes right into that drywall and creates a mold source there. Things like attics that are not properly sealed and there's condensation. In Colorado where I live, there's less moisture, but crawl spaces are a thing.

And if there is a microbial growth in a crawl space and your furnace or your air conditioner or your air sources for the home are in that crawl space. And again, I could go on and on, but as you can see, there's all these little things where we can have water intrusion. And anytime there's water intrusion on a source like drywall, which is like cardboard, right? It's like fodder for a mold. Within 48 hours, if it's not cleaned up and there's a water source, you're going to have microbial growth. So it's almost guaranteed. And if you have a leak or a basement flood, if you don't clean that up,

Dr. Jaclyn Smeaton (30:13.006)
100 % within 48 hours, you're pretty much guaranteed there's gonna be some microbial growth. So that's the framework. And like I said, even new homes, even homes that are multimillion dollar homes, they are not safe from the fact that mold can grow. Now what's happened is we've had quicker construction. If you look at the news, there's hurricanes, there's floods, there's damage. The weather systems have really disrupted things. And then

we've also had lots and lots of things that actually cause microbes to be

sensitized, for example, 5G and this is no conspiracy. mean, they've shown with a classical router and two Petri dishes. If you put those under a router, one shielded and one not, the one that is unshielded will have more production of mycotoxins because it's an organism that feels the threat of that electromagnetic frequency.

Fascinating. I wonder if that contributes to like, because there's like such higher pollen counts right now as well. Is that the same where plants are maybe disrupted and releasing more pollen?

I think so. really think our environment senses all these changes and even ticks, right? They're becoming more and more in the suburban areas because we're encroaching on that area. so whether it's infectious diseases or toxic exposures, I know I'm seeing. So I think what's happened, your original question was, why are we hearing so much more about it? I think there truly is more mold growth than there ever has been before. I think that there's more people realizing they don't feel well and they're wondering why and they realize mold could be an issue.

And then it's just more as it's being talked about. I often will just ask people their history. When did you last feel well? And then if we have this timeline of 2018, I moved into a new house and ever since then I haven't been feeling well, where there's a change in environment, then we know there's probably some environmental toxin of some type molded at the top of the list that might be affecting their health.

Dr. Jill Carnahan (31:57.9)
You would like could get goosebumps to know, but like our house, we built a new house in 2020 and we had a pipe leak or a pipe burst, right? And our builder came back. was right when it happened. And it turns out that the plumber like never sealed the two junctions of the pipes. And that's when it came apart. And then we got a bathroom leak, like below a bathroom, same thing. And then a third bathroom, same thing. And we realized that none of the joints had been properly sealed in the plumbing.

no, yeah, that's the thing, it's so, cause people all the time will have a new house. I know, but.

Brand new house, beautiful house. You we put a lot of money into getting it perfect for us and here we are, you know, trying to deal with all that. It does happen is my point. Like it

happens all the time, which is so scary. So what do you do when someone comes in with these symptoms? They're probably they see you because they're suspecting toxicity. Can you talk a little bit about the evaluation of a patient? What labs do you run? Is it serum? Do you do functional testing? There's so much out there.

It is, it really is.

Dr. Jaclyn Smeaton (32:57.134)
Yeah, I love that question because I always like to talk about, because again, someone listening might be interested, whether you're a practitioner or a patient or whoever between, and you may not have access to someone like me who does functional medicine. But the most important thing is if you literally, if I'm a doctor, I'm taking a really good history, just like we talked about, like a timeline. If you're a practitioner, you want to get a great timeline, and that's free.

And if you're someone listening out there who's just like, what's going on, write down all the things in your life when you last felt well, what happened then? It could be a stress or a divorce, a death in the family, a change in environment, because often you can put together some clues as to what things might have affected your system and especially hormones and all that, or menopause hit, right? So those things will kind of give you clues and that's free. And honestly,

I nowadays, I would say 100 % of the time, I know before I've done any tests with quite a good assurance if this patient has mold just from their history.

The second thing that's free is a visual contrast test, can be done online or in person. We do them in the office. You can do it online. It's called VCS, visual contrast study, and it tests the acuity of light and dark in your retina, and that is affected by mold. And it was originally developed in the 1940s as a biotoxin for the armed services to detect so they could tell if they had had exposure. So it's not specific for mold, but if that's abnormal, it's one more clue that's free. You can do it yourself online at home

okay maybe this is an issue. So those are free. Then when I see them I'm getting this good history and then usually I'll do a couple things. Number one, I do like urinary mycotoxins and total toxic load and there's several companies that do that now. I think Great Plains does it, I think Vibrant still does it and there may even be another one out there and this is a pretty much a urinary test. We used to have access to both blood and urine. Now there's not a good functional lab that does both that I know of but it's still a good screening and you

can kind of get an idea of the exposures.

Dr. Jaclyn Smeaton (34:46.446)
And then blood work, I still do a lot of the cytokine markers. We used to call it Sears Chronic Inflammatory Response Syndrome coined by Dr. Shoemaker. And that would be things like TGF-beta, ADH and osmolality, VEGF, MSH, C3A, C4A, things like even anti-gliadin antibodies or immune immunoglobulins. And then of course just CBC, CMP and hormones always are in the mix.

I still do the Dutch on almost every single patient because I wanna assess their entire hormone in the use. We have the blood work, the total toxic load in the urine. I usually do that with organic acids. I often will be doing a stool test just to assess the microbiome and then the hormonal. And that really is a good groundwork for most of my patients.

How important is the microbiome in our ability to detoxify and transform these compounds? You've mentioned it a few times.

I love that you say that because sometimes we're like, that's just this thing in our gut, but it's so interactive in our environment and it changes with hormonal effects. Like when we go from menstruating women to menopause, our microbiome changes. Men also go through some changes and it really does. So things like glucuronidation happen through the gut microbiome. So if we don't have that, that's a phase two liver pathway that we must need. And in fact, it's crucial for mycotoxins in particular.

So if we don't have the kind of microbes that help us with glucuronidation, we are impaired in our ability to excrete and eliminate toxins. So basically just a tiny tutorial, most toxins are lipophilic, which means they get stored in our tissues if we have a long-term exposure. And to get those out, we kind of have to go reverse. We have to get them out of our tissue. We have to mobilize them through exercise, through sweating, through infrared sauna, through glutathione, IV, oral, et cetera. And we're moving those out of the tissues back into the blood.

Dr. Jaclyn Smeaton (36:34.584)
where our kidneys and our liver can then filter them. The liver is a primary filter, obviously. It takes it from phase one to phase two into a water soluble metabolite, which is then excreted in the bile. And then the bile just squirts out with our meals in between meals, and it also holds cholesterol. And that's why a lot of the binders and things we use will be either bile acid binders or will be cologogs that cause more excretion of bile because the more we

can get that bile flowing into the intestine,

And then if it's toxic, actually bound out by clay or charcoal or glycomannan or colostrumine and pulled out through the stool, that's one of the main mechanisms of detoxification.

It's interesting because I was learning, I mean, reading more about beta-glucuronidase. And I think providers think about it when it comes to estrogen detoxification, but don't realize that it's an important step for biotransformation and elimination of like most other environmental toxins as well.

Yeah, literally all mycotoxins, which is crazy because there's like a lot of variety in how they're detoxified. So, alpha toxin versus ocher toxin, which is versus tricosathines. But all of them use glucuronidation as part of their pathway, which is kind of crazy. So, you can assume that that has to be working to some extent to detoxify from mold.

Yeah, so understanding if you are expressing a lot of beta-glucuronidase, which would basically clip that and make that compound reabsorbable, feels like a critical step. It impacts estrogen too, which is why we talk about it so much on Dutch, but a really critical step in being able to get well. Are there any patterns that you typically see on Dutch chest in patients that are more toxic?

Dr. Jaclyn Smeaton (38:04.428)
Yeah, so we talked about aromatase. So you can clearly see in both men and women where their testosterone is low normal, DHA is usually low normal, and they're over estrogenic. So their E2 might be extra high. And I don't know that there's always a correlation with four hydroxy, but I have seen a percentage of patients who are making more of the more toxic metabolite for hydroxy, and they're doing less of the methylation for the two hydroxy. So I would say the most common is excess estradiol and excess

for hydroxy and deficiency of the two hydroxy pathway.

fascinating. And what about cortisol and HPA axis changes? You had said before you sometimes see an elevation but then a decline in cortisol.

Yeah, so I would say initially, especially in a normal, otherwise healthy individual, you're going to have a hypercortisolemic and hyperinsulinemic response, which often causes weight gain like sudden 20, 30, up to 50 pounds in a few months. So often that will be this

hyper response of cortisol. And you can see that on the Dutch as well. Usually free cortisol is higher than cortisone, but you can see, you know, any sort of pattern. I would say that's more common. And then over time, you can see the depletion. So if someone

What happens with a lot of the mol toxins, especially things like mycophenolic acid is they're very immunosuppressive. So a common scenario might be they're in mold, they gain weight, they're hypercortisalemic, they're feeling very anxious, they're not sleeping. And then over time, they become more depleted and all of a sudden they're exhausted and tired, they're norepinephrine and epinephrine, their HVA is low. Eventually their dopamine markers could be low as well. And they're not sleeping, their cortisol.

Dr. Jaclyn Smeaton (39:46.478)
markers are all low and that's in time usually it can be depleted.

Okay. And as far as other hormonal tests, do you do serum tests as well with patients or anything else that you'd look for on the hormone side?

Yeah, so I do a ton of just regular blood work and I would say I do CMP, CBC, all the thyroid hormones, so TSH, free T3, free T4, reverse T3 and T4 and then also TPO antibodies and thyroglobulin antibodies. We'll typically do a metabolic screen, so A1C, uric acid, homocysteine, fasting insulin, fasting glucose. And then we also do AM cortisol, DHEAS, free and total testosterone, progesterone, high sensitivity estradiol,

I don't typically test E1 and E3 unless there's a specific reason for that, because I'm doing touch on all these patients. But I do that all in the serum. And then I'll typically check an ANA, an ENA panel for kind of autoimmunity. I'll check all of their immunoglobulin levels, IgG, IgA, IgM, IgE. And I'll check all those mold markers I mentioned before. C3A, C4A, if you can get a lab to do it, are particularly helpful because they're split complement products. And we typically see C4A more associated with a toxic exposure and C3A more

associated with an infectious exposure that can differentiate like is lime bickering issue or mold. And then I'll typically check up steam bar titers and some of the infectious things as well.

Dr. Jill Carnahan (41:10.306)
That's a comprehensive list and I can't believe you can roll off of those.

So efficiently, that's pretty amazing. You bring up when you mentioned Lyme, the fact that I

think one challenge is like patients are coming in sicker, right? You have layers upon layers upon layers of challenges. You are such an experienced clinician and I'm sure a lot of people listening are either having these complex patients in front of them asking for help or they're those patients themselves. Can you talk a little bit about how we can approach patients?

better with that? How do you address it? How do you peel back the layers of the onion?

Yeah, so I've really come to believe that majority of my patients are toxic load plus infectious burden combining to create immune dysfunction and inflammation. And I can't hardly think of any patients off the top of my head that aren't some combination of that. So as a clinician, you're looking for is there toxic load? We can assume yes. Is there mold? Because of course, if there's mold in their environment, you're not going to. So let's go talk about that real quickly. So say there's mold in someone's environment. It's affecting their hormones or affecting their health. If you just go along and give them glutathione,

and have them sauna but you don't remove them from the exposure or fix the, remediate the problem, you will never get anywhere. So with mold or most environmental toxic load, you have to reduce toxic load, clean air, clean water, clean food, make sure their home is mold free before you can really get attraction. But that's toxic load. Infectious burden happens because often this toxic load weakens immune system and so old infections that should be dormant.

Dr. Jaclyn Smeaton (42:43.534)
pop up and start to create problems. I love to talk about this with Lyme because people are, you know, worried about that and they hear about it or they might find they have it. I believe if we tested 10,000 people walking on the street, minding their own business, we might find 30 % of them have Lyme disease.

Like asymptomatic people who don't claim to have a problem. I think you're probably right.

So I believe there is a huge population that's been bitten by ticks or spiders and had some Bartonella Borrelia some form and they're fine because our immune system is meant to whether it's Epstein Barr old chicken pox or Lyme Borrelia

keep that down, these are not aggressive diseases, but what happens is we get into toxic exposure, we're stressed, we're not sleeping, we're not eating well. I think of it as limbo bar drops, immune system drops for some reason, and these old infections that should be

dormant, not bothering us start to come up and have problems. So that's helpful as a clinician or a patient because that's kind of the order of operations. And I always say very first you have to think about limbic system, we haven't even gone there yet, but if you have an unsafe feeling in your body for whatever reason, you will never heal. So you have to create safety.

whether it's dealing with your trauma, seeing a therapist, creating community, thought-filled therapy, brain spotting, any neuro-linguistic programming, I could name a hundred things, doing the work around your limbic system is number one. Number two is making sure there's nothing like mast cells that are disruptive and causing you to react to everything and kind of calming that part down. And then you go to toxic load, and whether it's mold or other chemicals, we need to decrease that toxic load. And then finally, you go to infections, because sometimes when you take care of limbic system, mast cell activation

Dr. Jaclyn Smeaton (44:17.454)
and say mold toxicity, sometimes you don't need to deal with those infections because that immune system has come back online and caused them to be in more of an dormant state again.

Now, when we learned about COVID, did they ever do studies on toxic load and people's susceptibility to a long COVID?

Yes, yes, there's absolutely, there was air quality studies where, areas where there was more nanoparticulate from pollution, 100 % more risk of complications from COVID and long COVID, because again, that weakened immune system. And then we also saw, and there's a researcher, Amy Proll, I had her on my podcast, and she's out of PolyBio Research, incredible nonprofit, and she's researching long COVID in the sense of COVID is really immunosuppressive. So often we find, not everyone, but I say a lot of people,

post-COVID will have a suppression of their T cell function. It can be temporary, but that's the thing that fights Epstein-Barr, Lyme disease, So what we're seeing is post-COVID, especially it's short term, maybe six months.

12 months, 18 months, people are having these activation of infections that were dormant after they have COVID. And again, that can be rebalanced, but in that little timeframe, even if it was a very mild case, a lot of people are coming up with positive Bartonella or positive Epstein-Barr reactivation. And she's actually demonstrating in the tissues the retention of spike protein and causing macrophage inactivation. So our T cells are being damaged

temporarily by the virus.

Dr. Jill Carnahan (45:45.248)
I mean, I appreciate you exploring this and kind of sharing this really this clinical observation and philosophy with us because I think what's really motivating about it or inspiring or positive, hopeful is that even if you can't track down the specific diagnosis, you're describing kind of these layers to improve our resistance and reduce our susceptibility to the mold exposure, the toxin exposure, the viral exposure that we know we're going to face.

Yeah, yeah, and that's what I love because even if you don't have a functional doctor or you're suffering, if you just start with clean air, clean water, food, put in a few things like maybe you do sauna once a week or I do Epsom salt baths every night or things that are just accessible, getting food from your local farmer's market, like these things do matter and they're accessible to everyone and yeah, we may have to prioritize a little bit more money for this thing or food or whatever, but in the end, you pay the farmer or the hospital, right? And you can choose in the beginning of doing those things that'll keep you out of the hospital

having a long health span.

The other thing that you've mentioned with a lot of these suggestions are one time investments. And that's another thing that I think about all the time. Like with patients, for example, throw out your nonstick pans and buy stainless steel. Then it's easy to avoid the PFOAs that come from that. Right. So that's a one time change that you don't, you make one time and then you're able to make it easy to have health be a part of your routine. Same thing with like get an air filter or a water filter. Then it becomes easier to make health a part of your routine. If you can make it the default,

That's better. Make your own coffee at home instead of getting it out on a coated, a plastic coated cup. Things like that that you can just kind of change up.

Dr. Jaclyn Smeaton (47:26.038)
I love that and again it seems overwhelming. I'll just say like when I got breast cancer and then the years following I was like my goodness my makeup, my bath and body products, my air fresheners, my cleaner, like everything was at risk of like what is this? Is it toxic? But I always say you know it took me like two years to kind of go through that and get a new routine so there's no rush on this and you just start today with what can you control. Maybe

I don't buy coffee out like you said or something simple or maybe I buy a cheap bag of Epsom salt. Start with a bath tonight. There's some things that are pretty accessible and you don't have to do it all.

But if you have that goal, because if you are not deliberate about your detox, or you go in the January, you'd go on a 21-day detox fast or something crazy, or go to a retreat, that's not going to cut it. You have to just incorporate daily habits that are doable and affordable for you and make it a part of your life. It just has to be nowadays.

Totally, and I think I love that approach of like this is about improvement and progress over time versus being perfect at the get-go and that's a mindset challenge for lot of people. They want to do everything they can, but it's like yeah, the next time that you run out of your face cream, buy a cleaner one. It doesn't have to be perfect, just better, know, consistent, those consistent improvements. What has really caught your attention lately in the research around this topic? Like what's the most...

kind of the newer pieces that have been cutting out. You mentioned the research post-COVID, which is fascinating. Is there anything else that's really caught your attention that's been a new learning in the last year or so for you?

Hmm gosh the COVID stuff is big because obviously we're all still being affected. It's going to be like the flu now, right? We're just going to kind of get it and and I think the biggest thing in that bucket is that it can be a very mild case like you barely know you have it or you have a cold and it's two days and you can still have pretty profound immunological sequelae. So it doesn't matter how severe the actual illness was. Age also doesn't matter. Granted the extremes are more at risk, but that also doesn't matter. So that's a big deal. I think the biggest thing is our toxic

Dr. Jaclyn Smeaton (49:24.856)
load is just exponentially increasing. And this isn't to have fear, but back to my point just a few minutes ago, we have to be deliberate. We have to be deliberate about our homes and our food and our water.

start with what is easy in front of you. You don't have to do it all, but if we're not thinking about it, we will be toxic. And the three things that come from environmental toxic load, among others, are autoimmunity, which is exponentially increasing, neurodegenerative disease, which Alzheimer's is a big fear for many people, including Parkinson's and ALS and other things, and then cancer. So those are some big fears. I don't

ever like to speak from fear, but if all else fails and you don't want to get those kinds of things, it's a reason to start being more proactive on our detox.

Yeah, I would add fertility as a growing concern as well. And I think about also that these compounds are not just affecting you, they have epigenetic impact as well that is translatable from generation to generation. And it's such an important piece for us to figure out before we grow a family, you know, because you can actually inherit or pass on the challenge with that. Yes. Now, when it comes to like advocacy, because ultimately this is a system problem, right? Like a hundred years ago even,

we didn't have many of these compounds in our environment, things have profoundly changed. And from what I can see, they went through a period where things were really bad in the industrial age. And then we started to have an awareness of the presence of these compounds. Now we remove some of them. Europe spanned them. United States a little slow to take action there. Can you talk a little bit about your point of view as a clinician on this? you know, we're talking about

Dr. Jill Carnahan (51:06.358)
breaking down a lot of the barriers of the EPA. What's the risk of that? This is a controversial question. I you can tell me to skip it.

No, I totally get it and it's funny because I'm like very apolitical. I don't do politics at all

But this isn't a left or a right issue.

That's where I come from because it is just a matter of our own health and our children and our grandchildren and our environment and our and once again kind of like if you're not doing something you're behind the game. It's the same thing as far as advocacy in your communities like for example you might start with your condo association or your golf courses. just published a or not published but shared a study that went viral on Parkinson's risk related to proximity to golf courses.

And it was insane the statistical significance of being one and a half miles from a golf course and how much higher your risk. I think it was a threefold. Don't quote me because I'm just, I don't remember, but it was a definite increase statistically significant in risk of Parkinson's. And I would say that's probably gonna fit all neurodegenerative diseases. So dementia and ALS and MS and some of these as well. But that should not shock us. And yet

it was shocking to people because

Dr. Jaclyn Smeaton (52:17.068)
The golf course is to keep that beautiful green manicured land. It takes a lot of chemicals and that's gonna go in your water supply or just the air that you breathe. So we could start by asking our local communities, our local HSAs, our HOAs in our environment, can you try to use some non-toxic chemicals and actually being an advocate for that because many people are not educated. So if you know to do better and you're not doing better, shame on you.

You know what's so funny is my husband sent me that clip of yours. yeah. he is, it's interesting because I think a lot of people are coming around. He's one of them. Like when I first met him, he was like, gosh, he's spent a lot of money on food or organic. What's the point of that? And now he's sending me clips like we should really let your parents know because they live on a golf course. We should let your parents know this is a problem. I wonder what they can do about it. But it does take a lot of information and it can feel overwhelming and there's a lot of disinformation as well.

Right?

Dr. Jill Carnahan (53:13.198)
But I love the chance to talk with you because you are seeing the patients who are most effective. And while right now we might be seeing the people who are most sensitive, most susceptible, and seeing problems first, but ultimately, if the problem's gonna get worse, we're probably all gonna be affected.

That's it. And you mentioned fertility. mean, that should be a really scary indicator how much the rates of infertility in men and women are rising. It is directly related to toxic load.

It absolutely is. It's such a core microbiome and toxic load. I mean, could honestly help the majority of people if we could get them thinking about it. Looking ahead, what do you hope future research will continue to explore so we can better understand and help people?

totally agree.

Dr. Jaclyn Smeaton (53:56.425)
That's a big one. think like biohacking is taking off and I don't even love that word, but I think one of that is like what can we do that is in our homes and every day and again, it could be

as simple as it doesn't have to be a fancy machine like PEMF, but maybe it's a bath. Maybe you take an Epsom salt bath. keep mentioning that because that's not expensive. It's not hard. Most people have a bath tip in their home and it's so profound. Like I don't go one day if I can help it without my Epsom salt bath because I feel so much better. So I think the future is just getting this to what I've seen is a shift over my 20 plus

years of practicing where the doctors had all the authority and all the information. Information is free now with AI is accessible to everyone and deep high research information. So we should now be able to be our own advocates in a whole different way and actually at this ground level, this community level be making these changes because now we have the information and the devices and the resources to do that.

And so I think that's what's gonna happen. And in fact, even in my practice, I have patients that come in, I'm so open to learning, and often they'll be like, hey, did you hear about this device or this thing? And then I'll go research and be like, wow, that's amazing. And so as we're more all equal and learning from one another, I think that the average patient will be so much more empowered. And that's what I hope to see.

I love that. And I want to really end with giving you the opportunity to talk about a huge project that you've been working on, which is documentary called Doctor Patient. Tell us a little bit about this documentary, what inspired it. Obviously it was a tremendous amount of work to be a part of this.

Dr. Jaclyn Smeaton (55:22.52)
Thank you, it has been a, and it's not even profitable, that's not why we did it at all. Documentaries don't make money and we probably never will make the investment back, but I had a passion to inspire and impact people on a level that was this emotional so they could actually see a story, hear what I've been through and some of my patients, because there's nothing like I realized, like even writing my book, that's one way, but when you see a movie, and we all remember a few movies in our life that like it changed our life and perspective, like that day I was.

know, and watch ET or whatever it is, like, right? These things in our lives. So I realized that that media had a power to impact people to make change in their lives more than many, many other things. And I don't know anything about making movies, but I had the faith to believe it could happen and it did. And so now it's on Amazon Prime, it's free on YouTube and Tubi with commercials. And so it's really available for people. And I just found it's a really, really great way to inspire people to understand they can suffer, but they can also

transform in that process. And...

I think somehow we all have stories, right? When we tell our story, we give other people permission to be in the weeds and figuring it out, but also so that they know that they too can overcome and they too can transform suffering into something that really not only fixes their own health, but can spill over. I can't tell you the number of people who walk into my office and maybe I've been working with them for three or four or five years and they're like, Dr. Jill, I just went back to nursing school. I just got a coaching thing. And I literally cry every time because I'm like, wow.

you took your suffering and your healing and now you're gonna help other people. There's nothing that excites me more and that's the energy behind the documentary.

That's amazing and really transformative. And thank you to you because you've done that yourself. I think especially coming from a medically trained background, to be able to speak from that point of view, it's so relatable because for those that don't have a background like that and maybe have questions about what have I done to cause this, why are the root causes here, to know that that can happen for anyone and then to see you model that transformation is incredible.

Dr. Jaclyn Smeaton (57:24.846)
Thank you.

Well I really have appreciated having you on today. If people want to learn more about you, we'll put links in the show notes, but what's the best way for them to reach out to or connect with you?

thank you. My main website has links to the movie, the book, my blogs, and that's just my name, Jill Carnahan, C-A-R-N-A-H-A-N dot com.

Wonderful. And we will follow you on social, you're on social prolifically. So they always bring really great valuable content. Thank you. Well, thanks so much for joining me today. And for those of you listening, really appreciate you listening in as well. If you liked what you heard today and you want to hear more from us, we release a new podcast every Tuesday. So we invite you to subscribe to us at Dutch test on any of the platforms that you follow for the Dutch podcast and also on social at the Dutch test. And we will see you next week.

Thank

Dr. Jill Carnahan (58:14.2)
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