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SPEAKER 1: Hello. Welcome to another episode in a brand new season of The Health Pulse Podcast. I am your host, Greg Hall, and in season 2 of our podcast series, we'll be focused on health innovation and looking to uncover where technology and new approaches will change the world of health and life sciences. As you know, we are now producing the podcast in two formats. So if you've been an audio listener, then I would like to suggest you also check us out on the SAS Software YouTube channel. And of course, we still welcome your questions and comments on both the YouTube channel and our email address, thehealthpulsepodcast@sas.com.

For this episode, I am joined by my guest, Dr. Melissa Strong, and she is the founder and lead data scientist at IndiOmics. Dr. Strong, Melissa, thank you very much for joining us today. Welcome to the podcast.

SPEAKER 2: Thank you, Greg, for having me and for everyone who's listening and watching.

SPEAKER 1: And it's a beautiful, lovely day here in Toronto, which is where I'm based. Where are you today? And what's it like there?

SPEAKER 2: I am coming to you from the SAS headquarters in Cary, North Carolina, also a beautiful day. No complaints.

SPEAKER 1: I haven't been there in quite some time. Hopefully I'll get back soon. So first of all, let's just start off with some background about yourself. Tell me a little about your field of study, what you're interested in pursuing in your career, and how that led you into IndiOmics.

SPEAKER 2: I mostly study molecular biology and epigenetics. We focus on how the environment can affect our gene expression. And my background would be in biomedical engineering. I went to graduate school for mostly breast cancer research. And what sent me down this path was conceiving and having my son. And it was the wealth of information that I had to digest as a scientist during that time that made me want to help communicate it to other crowds.

SPEAKER 1: Fantastic. And as you know, on the podcast we always want to find out something else about the folks we have on here. Tell me about something you do when you're not expressing genetics.

SPEAKER 2: Photography is a really big interest, like it is for a lot of people. And especially macro photography-- looking at the patterns at very small levels that also tend to show up at very large levels. I find that very interesting.

SPEAKER 1: Fantastic. Yeah. Me, too. Actually, It's something that we spent some time doing ourselves, trying to get some of those real close up images, particularly some of the wildlife we see in the garden here. Is there anything in particular you like to take photos of at a macro-level?

SPEAKER 2: Same thing. Plants have the most amazing structures. And to see things like the golden ratio-- different mathematical relationships show up there in shells and fossils. Yes-- a lot of great subjects out there.

SPEAKER 1: Fantastic. And think about IndiOmics Tell me a little bit about the company, what it was set up to do, and what it is that you offer.

SPEAKER 2: IndiOmics sprang mostly out of our efforts to educate the public. It was a very new idea a decade ago that, "Hey, there are common chemicals in our water, and our consumer products, that actually do have the ability to affect us on a cellular level." Oftentimes, we focus on how chemicals act as endocrine disruptors. So that could be mimicking our hormones like estrogen, or blocking others like testosterone.

So we realized that there was a bit of a demand amongst the public to have more of a personalized look at-- what has an individual been exposed to? Is it affecting them on a molecular level? And more importantly, are there simple modifiable steps that that person could take to potentially avoid, if not entirely prevent, future exposures? We offer a way for someone to send their urine into the laboratory. We'll look at dozens, if not hundreds, of very common types of EDCs, and see if we can correlate that to modifiable factors, once again, which could be as simple as not heating or microwaving plastics, in some cases.

SPEAKER 1: All right. Interesting. And to achieve this, you must have some interesting toys that you utilize to get results. So tell me a little bit about the technology used to support your work.

SPEAKER 2: A lot of these measurements have to be performed using chromatography and mass spectrometry instruments. They tend to be rather sensitive. We can detect almost anything in any sort of mixture if we know what we're looking for. So unfortunately, at this point, IndiOmics has not been able to afford one of these lovely instruments yet, but we are moving towards a partnership with a laboratory here in the Research Triangle Park called RTI International. And they have an amazing collection of resources, know-how. They've been measuring some of these endocrine disruptors for several years already, so the methods are there, and the capability to process the number of samples we would need.

SPEAKER 1: Fantastic. Think about the field of epigenetics as a whole. What do you wish the general public really knew about the study of epigenetics and gene expression? And why do you think people should know more about it?

SPEAKER 2: A lot of us have heard the idea of nature and nurture. We're each born with a set of genes from our parents, but from that moment of conception in the womb to at this present moment, it's a constant metering of environmental inputs that could range from stress, it could range from limited resources to the immune system, possibly seeing a new virus or bacteria. So constantly trying to achieve homeostasis. And it's much more plastic than we might think, and I'll use plastic in a good sense, in this case, in that our cells have plasticity. Our gene expression is not set in stone. And we can take steps to either encourage preventive measures long-term, or to go down a route in which we abandon understanding how the environment can affect us.

SPEAKER 1: Fantastic! I'll just pick it up on what you said there. Are there certain risk factors that make somebody more or less susceptible to chemicals? And what kind of factors might they be?

SPEAKER 2: Absolutely. I've already mentioned conception and in utero growth several times. So that would be the window, where if we can prevent as many exposures as possible, we feel that has the strongest long-term benefit. So in utero, highly-susceptible, let's say someone is an adult with a pre-existing inflammatory or immune condition, their body is probably going to be more likely to experience chronic inflammation with the right mixture of environmental insults. And let's say, someone who has had the genetic testing performed, they're aware that BRCA2, a gene involved with breast cancer susceptibility, runs in their family. Maybe their cells are expressing it. In that case, it would be very important to avoid anything like an estrogen that could act as a fuel to form a breast cancer.

SPEAKER 1: That's an interesting point because we hear a lot about that as a particular example. I think that's very well publicized. People know that example well. Angelina Jolie is probably the person that most people would think about in that context. But think about other conditions that are very pervasive at the moment, and there are other things that we should be looking out for that this kind of research can help us understand.

SPEAKER 2: A lot of people are experiencing metabolic challenges at this time, whether that's diabetes, obesity, et cetera. We know that we're almost to the point where half of the children in certain communities are now obese, and that's clearly a very different state from what our ancestors had 100-200 years ago. So it really, once again, all goes back to the womb. Hormones tend to tell our fat tissue to divide. It tends to tell our bodies to shore up resources that we might not have later. So if we can avoid any artificial hormonal process at that state, we haven't epigenetically reprogrammed adipose tissue before someone is even born.

SPEAKER 1: Interesting and thinking about the technique they use. If I wanted to be involved in this-- I wanted to find out about myself-- talk me through the process. How would this work?

SPEAKER 2: So much like a lot of your gene and hereditary testing, you would order a kit. It would come to your home where you would add your sample. In most cases, like I mentioned, that will be urine. In some cases, it will require blood spots. But that's for more of looking at chemicals like PFAS. So your basic panel, add your urine sample-- it's going to be shipped to the laboratory. And then you will log into your secure dashboard where you get to interact with your results, look at visuals that explain where your level is compared to others in your demographic, where your specific exposures might be coming from, and what sort of personalized lifestyle modifications you could take right now to mitigate some of those exposures. And we encourage people to have a second test, because in the past for me, it was very empowering to see levels of bisphenol or parabens or phthalates get reduced in my own system after that first test.

SPEAKER 1: Interesting stuff. Isn't there a point where it's too late? Is there an age where you say, "Well, no matter what you do now, it's done."

SPEAKER 2: It would be hard to place a number on that, but I would say that even if we're on our 80s, we're still susceptible to developing cancer. Age is actually the most correlated factor with our cancer risk - the older we are, the more likely it is. And a lot of these chemical exposures-- yes. Let's say we had them in the past, but if we can prevent further accumulation, which would be the case with a lot of PFAS chemicals. It's a womb-to-tomb accumulation within the body. So at any point in our lifespan that we can stop that, that's still going to have some cellular effect.

SPEAKER 1: So effectively, there's two areas we look at here. One is a cumulative effect and one is a more of a day-to-day effect. And I guess it's that cumulative effect you're looking to try and stop.

SPEAKER 2: In certain cases with certain chemicals that don't break down-- yes. We certainly don't want to add to that load within the body. But I will say the good news is that some chemicals like bisphenols-- our body does recognize them well enough to metabolize and excrete them. So let's say we have an exposure to bisphenol A. Within about 24 hours if we can just stop further exposure, our body is actually really good at getting that class of compounds out.

SPEAKER 1: Interesting. In looking at other things that maybe even more self-inflicted, like tobacco smoke and alcohol, I've heard in the past that, yeah, once you stop those things, you probably will recover from them over time. And I guess that must be similar for a lot of other chemicals.

SPEAKER 2: A lot of these long-term effects in humans are still relatively unknown. Some of these studies would take years, actually, to carry out to see long-term effects. But yes, we believe that if the risk can be mitigated as soon as possible, our immune system, if it's not facing such a chronic state of inflammation, will have time to re-balance, possibly rest a little bit, so that homeostasis can be re-established. We do believe that's possible.

SPEAKER 1: This all sounds fantastic but I also think about an opposing view. Is there controversy in this area? And do you experience controversy? Are there any push-backs on your ideas that you see?

SPEAKER 2: Certainly. I'd say every scientist in this field has at one point been told that the environment is not nearly as much of a factor as genetics, that these very low levels of chemicals can't be affecting us on a cellular basis because the traditional route was-- the dose makes the poison. We have to have a certain amount of something for it to truly be considered toxic. But with the case of a lot of these endocrine disruptors, we're seeing that even at relatively low levels, like the types we would be exposed to daily, if we're interacting with them in plastics and personal care products, do still induce a short, if not long, term effect.

So it took the field quite a bit of changing to recognize that. And it was also the emergence of epigenetics being studied in the context of gene expression. But personally, early on I heard things like, "This type of information could be dangerous. The anxiety that it could induce in someone could be actually greater than long-term risks." And also that taking more of an activist outreach route could damage some of the scientific credibility. But if anything, the outreach was 100% necessary to turn the public onto this type of research.

SPEAKER 1: You gave a simple tip at the beginning almost in passing. You talked about, "Don't microwave certain plastics and that will help." Are there other simple tips like that? And where might somebody who's generally interested in learning more about this go and find out that kind of information?

SPEAKER 2: There are several great groups, one being the Environmental Working Group, ewg.org, that released peer-reviewed, scientific-backed steps that anyone could take whether or not you know your levels of these chemicals. And like you mentioned, it's trying to minimize plastics within our food prep at any step that we can. You mention heating, but it would also be freezing. It would be trying to avoid nonstick utensils and cookware, because traditionally those are coated with PFAS compounds to give them those properties.

It's also doing a little detective work with the products you buy. We have ingredient labels. So if you get used to looking for the word paraben in any personal care product, you'll generally locate it rather quickly on the label, and just pass by that product, and look for one that's paraben-free. And once again, ewg.org has a whole database for looking up different personal care products, even when you're at the store buying them or buying them online. And IndiOmics also has a healthy-living pocket guide on our site, IndiOmics.org, in which we also break down simple steps by category.

SPEAKER 1: Interesting. That's great. I'll go and have a look at that that myself. Just a wrap up question really-- I'm thinking about the future. So where do you think this is going to go in terms of a study, in terms of becoming a publicly acceptable? What do you see the future being for someone in IndiOmics? And also, as you bring that together, what do you think are going to be some of the benefits that we see in the near future, or that you're trying to pursue?

SPEAKER 2: In my opinion, we're already seeing a lot of these things happening. It seems younger generations are definitely alert to questioning what is in their products. What are they buying? What are

they putting in their bodies as a result? So as millennials and my son's generation, Gen Zers, get older, they would have grown up with that mindset of-- ask questions. Don't automatically trust that if a product is on the market, it is safe for us. And manufacturers are listening to this. I've seen a massive shift within the personal care product industry and food industry towards being plastic-free, being free of phthalates, parabens. Most of them will actually market this on their label because they know that there is a rising wave of consumers that are seeking these out.

So usually, if we want to get things to change, we have to hit things at the point of profit. We have to have enough people who are refusing to buy the other products. Believe me, manufacturers will follow suit and change. And we can only hope that regulatory standards would also improve. There is a big discrepancy between a lot of our chemical laws here in the US compared to those in the EU, and other areas of the world. So it's also getting that public demand with legislature and our regulatory bodies that usually those changes will start to occur. So it's happening, and it'll continue to go to this point so that maybe there won't be a paraben-containing lotion for sale, at all, in a decade from now.

SPEAKER 1: That's really interesting. I'm a great believer that we've got to stop doing healthcare. We've got to start doing much more wellness, much more prevention. So how do we get to a point-- and I said that was my last question. But you just inspired me with another one. But how do we get to a point where I can go and see my primary care physician and they're going to say to me, "Hey, you need to have this test done because we want to look into some of the risk factors for the future." Where are we along those lines?

SPEAKER 2: Well, we're certainly hoping that after the appropriate clinical trials and approvals can be achieved with certain studies, that this would be something like a routine blood test, that when you go to your doctor, whether or not you have a specific concern, you could find out about levels of an array of endocrine disruptors, just like you could find out about heavy metal exposures, which a lot of us have already had done. And that your doctor could help guide you through those lifestyle steps, especially if you are planning on trying to conceive, are pregnant, are raising young children. Usually we're going to care a lot about protecting them, in that case. So I do think it will be routine at some point.

SPEAKER 1: Fantastic. That's a great place to wrap up with. Thank you, Melissa. Thank you, Dr. Strong. Thank you for coming along today and for giving us some great insights and some fantastic discussion. I find the whole area absolutely fascinating. And I'm sure our audience will, too. And so now, it's over to you, the audience. Please, can you email your questions and comments to thehealthpulsepodcast@sas.com, or add them on the comments on YouTube. I'm really interested to hear what people think about the availability of these kinds of wellness programs through primary care. That will be a comment I'm particularly looking to see folks come in on.

And from our season 1 feedback, we've used a lot of that to create season 2. Thanks to people who've contributed. Thanks to the questions and the emails we've received. Please continue to keep them coming, and as I say, it's thehealthpulsepodcast@sas.com. My name's Greg Hall. I have been your host today. So please remember to subscribe, either through your podcast aggregator or through the SAS YouTube channel. And we hope to bring you another episode very soon. Thank you. Bye.

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