



## Episode 209: Sun Protection and Anti-Aging From the Inside Out With Polypodium Leucotomos

Child: Welcome to my Mommy's podcast.

This episode is brought to you by Organifi and I'm so excited to finally tell you about them! Because, here's a confession... I have known about Organifi for a really long time and even though so many of my friends and experts I trust rave about them, I never tried their stuff until recently because I thought... first of all, how can it actually be that good? Well, I tried it and it turns out that it is not only that good, it's better than I expected! Organifi has green juice, red juice (which is an antioxidant red drink and it's delicious) and a golden milk turmeric drink, along with a plant-based protein. Everything they have is completely organic and they all actually taste good, unlike a lot of other green drinks and protein powders. I've especially been loving their red juice lately... especially at this time of year for immunity. It tastes amazing and it has a blend of antioxidants from strawberries, cranberries, blueberries, pomegranates and they also add in beets, cordyceps, reishi, rhodiola and a lot more. So, this particular blend is formulated to increase energy, boost metabolism and reduce factors that lead to aging. Their green juice is minty and delicious, and I noticed it has almost 800 5-star reviews. You can check out those two products, along with their whole suite of products and save 20% just by being a listener of the Wellness Mama podcast. Go to <http://organifi.com/wellnessmama> and use the code: WELLNESS20 for 20% off.

This episode is sponsored by Four Sigmatic, a company whose delicious drink mixes I use daily in some form. I've been fascinated lately by studying the benefits of medicinal mushrooms like Chaga, which has more antioxidants gram for gram than anything else on the planet. So one serving for instance has the same amount of antioxidants as 30 pounds of carrots. Crazy. Cordyceps which is great for the immune system, Reishi which helps promote restful sleep, and Lion's Mane which is thought to promote focus and brain health. Four Sigmatic takes these superfood mushrooms and blends them with coffee for a brain boosting jitter free morning drink. They also have a line of delicious elixirs that are caffeine free and great for any time of the day. I almost always end my day with a warm cup of their Reishi, which makes a noticeable difference in my sleep quality and I often begin the morning with a cup of the coffee with Lion's Mane. My kids love their superfood hot cocoa and I love that the Reishi helps promote calm and sleep! You can check out all four stigmatic products at [foursigmatic.com/wellnessmama](http://foursigmatic.com/wellnessmama) and save 15% with the code wellnessmama.

Katie: Hello and welcome to the Wellness Mama Podcast. I'm Katie from [wellnessmama.com](http://wellnessmama.com). And today we are talking all about sun protection and anti-aging from the inside out. I am so excited to be joined today by Chris Tolles and Dr. Emilia Javorsky to delve into the science behind how we can protect our skin from sun damage and aging using specialized compounds and nutrient-dense compounds and foods. Chris is a health care entrepreneur who's been focused on finding innovative solutions to the challenges that we're facing in health and wellness. And Dr. Javorsky is a physician scientist focused on developing new tools for health and well-being. Together, they've created a product called Sundots, which we're gonna talk about today. But I'm also really excited just to go deep on the science of how the body can protect the skin from the inside out. So welcome guys. Thanks for being here.

Chris: Thank you. It's a real pleasure.

Dr. Javorsky: Thank you.

Katie: Likewise. These are my favorite podcast episodes, the ones where we get to get a little geeky in science. And I know a lot of the listeners like these episodes as well. So I'd love to start off with talking about sun protection and sun exposure. And I know I told you guys this before we've been on air, but this is the part of

the topic that I have a feeling we're gonna slightly disagree on. So, I can't wait to jump into the fun science part. But I wanna like kind of call it the elephant in the room here first. I know all sources agree that sunburn is harmful and should absolutely be avoided. And I know we're all on the same page for that. At the same time, I'm a data nerd. So I know that we're seeing rates of skin cancer continue to rise even though statistically we're wearing more sunscreen than ever before and we're spending less time in the sun. So to me, this just calls into question that often touted idea and it probably isn't this way in the scientific community but in the online world where sun exposure equals skin cancer cause-and-effect boom. And I think there's just a lot more to this story. And I know we talked about this briefly, but I wanna say in front of the audience as well that I fully believe that we all grow and learn the most when we can have like slight disagreements that make us all learn better and move forward. So I'd love to hear your thoughts based on your research on sun protection and sun exposure and what the current data is saying.

Dr. Javorsky: Yeah, great. Thank you so much for that. And I completely agree. I think that anytime you kind of delve into these topics in real depth, kind of getting input beyond the headlines that you see every day, you realize that things aren't as black and white as they would kind of look from the outside. One thing I would say about some of the trends that you've described about increasing rates of skin cancer and sun exposure and sunscreen is when you really dig into the actual use patterns of sunscreen, you see that it's pretty sub-optimal. When people put on sunscreen, let's say at a day at the beach, the data out there shows that they pretty much put on a quarter to about a half of what you would need to get the actual SPF that's labeled on the bottle. So when they do put on sunscreen, they're not putting on enough. People don't tend to reapply every two hours, which is the recommended reapplication sort of rate. And people tend to think of sun protection as kind of a day at the beach kind of scenario.

So I know many friends of mine that have sort of the same bottle of sunscreen from the summer before that they then take with them to the next summer when they go to the beach. When you really dig into it, sunscreen just isn't used the way that it's intended to be used in order to give you the protection that's kind of listed on the bottle. And those kind of everyday use patterns are totally understandable because it's hard to remember to put on sunscreen. It's hard to remember to reapply. And so a lot of that kind of use patterns behind sunscreens is part of the reason that Chris and I actually started Sundots because we saw that, well, it's a great tool in the sun protection toolkit. When you look at it kind of in practically in everyday life, it's hard to incorporate. And so we saw that there was a need for other tools besides sunscreen and in addition to sunscreen to help protect ourselves against the sun.

Katie: That makes sense. And I guess from my perspective, I always thought throughout human history, we've always had exposure to the sun, although I think perhaps throughout history, we were better about covering up or wearing hats that people weren't just tanning or sunbathing all the time. But just based on my research, I've seen a lot about the benefits of sun exposure, not just for vitamin D, but it seems to go beyond that as far as triggering important cells in the eye that lead to avoiding things like macular degeneration. In fact, there was a review I think in 2016 that I read. They said that sun exposure in general, obviously non-burning, say, small amounts of sun exposure, had benefits like reducing the risk of other types of cancer through vitamin D, also reducing risk of cardiovascular disease, Alzheimer's, macular degeneration, and even multiple sclerosis. Of course, again, back to the non-burning sun exposure. I know we all agree on that. But do you think there are benefits to like small amounts of sun exposure that are in keeping with the person's skin tone and what climate they probably were originally designed to be exposed to it?

Dr. Javorsky: Yeah. So, I mean, the data out there is obviously most well-documented and compelling from the vitamin D world. And I see this all the time in the medical, kind of, and scientific community is there is this give and take between sort of the dermatology community who's very much an advocate of there is no safe sun exposure and the vitamin D community who says, "You know what. There are health benefits to low level sun exposure," vitamin D being one of them. Some of the other ones that you've listed. And there is this give and take between those communities, each citing kind of different bodies of data that they have. The jury is still I think pretty much out and in my opinion on kind of what is that safety threshold, what is safe levels of sun exposure, as you've kind of alluded to it, it probably differs for people based on their skin type. There's also people that maybe don't absorb vitamin D supplements really well and prefer to get their vitamin D from the sun.

So, there definitely is an area of contention here and if that debate is alive and well in the science community. From our perspective, we're strong advocates of kind of protect yourself every day against the sun. But we also recognize that based on that recommendation, there's kind of all the things we're supposed to do ideally, right? Ideally, we're supposed to do so many things for our health. Ideally, we would eat well every single day of the year, eat healthy foods. But we understand practically like some days people don't eat healthy foods. And that's just part of life, and then the same thing goes with sun protection.

We understand we can advocate for really sort of having some level of protection on board every day. The level of protection even, again, if you're using our product, if you're using sunscreen, you're never protecting yourself 100% getting all those rays sort of not coming into your skin. So you are going to have some level of sun coming to your skin even if you are engaging in sun protection every day. And we also know that there's days that people are gonna forget to do this because life happens and it's busy and there's a lot of things to remember to do for our health and wellness. So our goal is really to give people as many tools as we can that are kind of compatible with their life, understanding that this isn't going to...in sort of practice, this isn't gonna be 100% protection against the sun.

Chris: And I think related to that is that if... When we looked out on consumer behavior landscape and we saw a group of people that only spent time underground, in kind of total darkness, never stepping outside, never glancing at an open window, yeah, we'd probably be concerned. I think intuitively, we know a lot of what you just said, Katie, which is that there has to be something valuable about what's going on outside from the sun as well but kind of forced to choose which of the risks Dr. Javorsky and I at least are more concerned about. It sort of seems that right now, yeah, the overexposure piece may be the greater challenge. That's not at all to discredit that absolutely there's probably something important going on in our bodies as regards to sun exposure. But since even when we do our best, we get a bit of that no matter what. It's kind of like we choose which side we wanna be wrong on. And in our case, it does seem clear that more sun protection in this case is at least the direction we need to head. Where is that threshold? Where is too much sun protection too much? We won't pretend like we've got a perfect answer for it. But if we had to move one direction, I think kind of our choice is clear.

Katie: That makes perfect sense. I'm sure you guys probably are maybe getting this feeling as well in all of the research that's coming out. So much of it points to personalization and individual differences and how what works for one person may not work for another. And probably even with sun exposure, that's gonna be a large part of eventually figuring out those answers is that it's not the same for everyone. I'm glad you guys

mentioned sunscreen. And I wanna touch a little more on this, because I get this question pretty often especially with the recent ban on certain sunscreens in Hawaii. And I'm guessing you guys have probably gotten some questions about this coming your way as well. But now with more knowledge about some of the ingredients in certain kinds of sunscreen potentially being harmful, I'd love if you guys could share any guidelines you found in the research on choosing safe sunscreens.

Dr. Javorsky: Yeah, totally. So this is something we've written about and we're super passionate about and has really informed kind of our strategy and sort of the types of people we like to partner and work with from the sunscreen arena. So, as you alluded to with the ban in Hawaii and also data coming out across what we call chemical-based sunscreens, there's pretty good data out there that show that these aren't necessarily the best things to put on your body. There's pretty strong toxicity. What we call something being toxic, data about how harmful these are for the environment. So that's part of the reason that Hawaii banned these sunscreens, is they're killing off coral reefs and other parts of the marine ecosystems. And so there's kind of this question of like, "Well, if this sort of ingredient is getting into the ocean and killing off coral reefs and animals, is that something I really wanna be putting on my body?" There's also work that's been done in lab. So not necessarily in humans but in the Petri dish that shows that these could have potentially harmful effects, acting as something called an endocrine disruptor. And the main thing is a lot of these chemical ingredients are kind of grandfathered in the way that the regulatory system works for approval of sunscreens, that they've been around for a really long time and they didn't have to go through the same level of scrutiny and safety data that a sunscreen ingredient seeking approval today would have to get. That being said, there haven't been any news on screening ingredients in a very long time, in the past 30 years here in the U.S., not the same overseas. There's many more ingredients available.

So based on the ingredients that we do have available to us, we recommend that people use what we call the non-chemical or the physical sunscreen. So these are things like zinc oxide and titanium dioxide are good ingredients to look for on the label. And we also recommend using the non-nano formulation. So that just means non-nano refers to the size of the particles that are in the sunscreen, whether they be the zinc or the titanium. And you wanna be sure that the particles in there are of a big enough size that they don't get absorbed into your body. So some of these formulations that are out there use very, very small particles to try and mitigate the fact that the sunscreen can make you look a little white. But looking a little white is a good thing. In terms of safety and if your goal is to put kind of the safest sunscreen on yourself, we highly recommend mineral sunscreens. Look for that on the label and look also that they're non-nano formulations.

Chris: And what's awesome is that like we do have choices. We hear a lot about the controversy around chemical sunscreens that very much overstates the risk. Lack of evidence is not evidence of lack. And we acknowledge that, but because we have choices, that's why we're saying, "Hey, you've got a choice," like choose a physical or also called a mineral ingredient. What we do like to help people understand is that much of the controversy around chemical sunscreens is not coming from, for example, human data. It's us extrapolating some of what we observe in a marine environment like Dr. Javorsky mentioned. The challenge is that like, of course, if...there are many things about a marine environment that are different than ours, like if I lived underwater the way coral did, I would also die. So we know that they're not like perfectly directional for what we should be concerned with, but since we do have a choice, like why not exercise it? And that's why we're also proud to partner with a lot of awesome mineral sunscreen brands that are out there that are trying to give people choices.

Katie: Yeah, that's a great point. And as a scuba diver and someone who lives near and loves the ocean, I agree. I think we also do need to be concerned about the marine aspect. Even if that's not gonna translate into human health, it is important for us all that our oceans are healthy too. So, it's a great point to bring up. And I wanna in just a minute go deep on the internal side. But first I wanna make sure that we have an understanding of general terms before we jump in. So when it comes to sun exposure, there's from my understanding UVA and UVB and some sunscreens block one and not the other or block both but not completely. So before we go further, can you explain the difference between UVA and UVB and what they mean for the skin?

Dr. Javorsky: Yeah, both sources of UV light, UVA and UVB, are detrimental for skin health. It's a general kind of way of thinking about it, is that the UVB light is the type of light that plays a big role in the development of skin cancer long-term and a minor role in skin aging, whereas UVA light plays a key role in skin aging and a lesser role in skin cancer. And so one thing that I think we'll probably talk about a little bit later is just how pronounced the effect of sun exposure is on the aging of the skin. So the World Health Organization estimates that up to 90% of preventable skin aging is, in fact, due to sun exposure. So protecting yourself against the sun is sort of a great thing you can do from an anti-aging perspective and it's also a great thing you can do from an overall skin health perspective. So both types of light are detrimental to the skin. One thing that I think people don't think about a lot is when they're driving in their cars or they're in an office or in a building, they feel like, "Oh, I can't burn because I'm here behind glass." And while that is true because most glass blocks that what's called the UVB light, that sort of cancer-causing minor role in aging light, it does not, in fact, block out the UVA light, which is sort of more of your skin aging, minor role in cancer type of light. So you still are getting those aging effects from the sun whether you'd be driving in your car or by a window at home, in the office, what have you.

Katie: Gotcha. And one thing I've always wondered because it feels like, at least the data I've seen, sunscreen even doesn't always block fully both of those. But if UVB is the one that tans or burns and it's blocking that one, do you think in a sense some sunscreens can get people a false safety net because they're not feeling the effects of it and so they think they're safe whereas they're still getting that UVA?

Dr. Javorsky: Yeah, totally. Having any sunscreen on board is better than no sunscreen. But you definitely want to look towards the broad-spectrum sunscreen. So as we talked about with those mineral sunscreens that we prefer, we had to kind of pick amongst the sunscreens available to us, those that do offer broad-spectrum protection against UVA and UVB light. So looking for a broad spectrum is something, that's also very important, to have coverage against both of those types of light, the sort of aging component and sort of the skin cancer component.

Chris: That's also why we have so many different sunscreen ingredients, is because they behave differently on the skin and they protect differently against different parts of the spectrum. So oftentimes, if you're thinking about formulating a sunscreen, it's sort of a baking exercise of how sweet do I want it to be. Do I want raisins in there? Similarly with sunscreen, you'll typically mix and match different ingredients that will get you to the target protection that you want, but not all ingredients do as well across the full spectrum. And this is pretty well established data because this is how you establish some of the SPF values, is understanding what the inputs are.

Katie: Gotcha. Okay. So this brings me to the point that I'm so excited to jump into with you guys, and I feel like this is not as widely known. Something I stumbled across about 10 years ago but basically the internal side to sun protection, because I feel like, especially in America, we tend to think of like topical first or even like for acne, we like wanna put something on top of our skin rather than address what's in the body or for sun protection, we only wanna put something on top of our skin rather than also look at what's in the body. And I know from my research, there's like an inflammation connection to sun exposure as well and there's a lot that goes on inside the body. But obviously, this is your area of research and ingenious. So I would love for you to just explain kind of in a basic level and then we'll go deeper what it means like internal sun protection from the inside out, how that works in the body, and what the mechanism is.

Dr. Javorsky: Yeah, absolutely. So as you say...you used the acne example there. What's really cool about sun protection is it's a combination of both. You kind of need both things on board to protect yourself against the sun. So what do we put on our skin and then what do we put in our bodies? So we talked a little bit before about what we put on our skin, so sunscreen in our previous conversation. It surely isn't limited to sunscreen. There's also UPF rated clothing, which we highly recommend that people use when they're out in the sun. You can wear a hat. You can use an umbrella. You can sort of get in the shade. But all of those different sun protection mechanisms are preventing the light from getting onto you and into your skin. The flip side of it that we're talking about, about things that you put into your body, is how can you help your body deal with the sunlight that does get into your skin, that does get through those kind of shading mechanisms that...in tools that we use. So there's... Our body is like naturally has its own repair mechanism. So when sun sort of gets into the skin, it can do two types of things. It can directly damage the DNA in our skin cells and it can also generate a different type of damage called oxidative damage or free radical damage, which basically the sunlight makes ourselves do all of this crazy chemistry that can damage our proteins and other building blocks that enable the cells to function really well. And so our body has these kind of natural repair mechanisms. And so what these different oral approaches do and what our approach is here with Sundots is they help to boost your skin's sort of natural defense mechanisms and natural repair mechanisms to deal with the sun damage from the sun that does get through the sunscreen and the UPF holding to your skin.

Katie: So let's go deeper on a couple of those substances and how they work, because like I said, when I researched this 10 years ago, my personal story was I have Irish-Scottish heritage. I never spent much time in the sun, because growing up, I would burn very quickly. And as I improved my diet and reduced inflammation and ate a lot of these foods that contained some of these substances, I noticed that I burned less easily, which made me want to research the connection. So for me, it was things like lycopene and antioxidants and astaxanthin. But you guys have a substance that I wasn't even familiar with until I met you guys and researched it, which is polypodium leucotomos, if I'm not butchering the pronunciation.

Dr. Javorsky: No, that's perfect.

Katie: Awesome, So can you explain what that is and how it works?

Dr. Javorsky: Yeah, sure. So a little bit of kind of my origin story of how I got into this. So it was really when I was in med school and I was doing dermatology research over at the Department of Derma at Harvard Medical School that my...sort of the investigator I was working with kind of gave me a task to do a review of all

of the oral photo protective ingredients. And I was like, "Huh, that's strange," like I didn't know there was a category of oral photo protection as a med student. It wasn't until I got deep in the derma world that I actually learned that this was kind of like a thing and a tool. And then she asked me specifically to see what stacked up against polypodium leucotomos. And so then I was further surprised to realize like, okay, not only is there a category of this kind of oral sun protection, but there's actually something in that category that's the gold standard. And I really started digging into the research behind polypodium leucotomos.

So what it is it's an extract of a fern that's endemic to South and Central America and it's been studied for over 30 years for these sun protective properties. So it's been used extensively kind of throughout history and traditional medicine in South and Central America for different inflammatory conditions. But it's really over the past 30 years that it's been studied properly in kind of academic settings and in clinical trials. So it's been used for the sun protection purpose in Europe for over 30 years now. And in some countries in Europe it's actually used as almost like a prescription medication. And what's really cool about it is that there's at this point over 12 clinical studies that have been done on the ingredient including ones that have been published in really leading dermatology journals. So we're talking about journals like "The Journal of the American Academy of Dermatology" that have studied both its safety and then efficacy against UVA and UVB light and helping to provide your skin with some protection against the damage that that can cause. So from a science perspective, this got me really excited seeing that there was both a really long use history here behind this ingredient and also that it had been so well studied in really high quality academic studies. And so that was...

Chris: In humans.

Dr. Javorsky: Yeah, and the fact that these studies were all done with humans. We talked about this a little bit with the sunscreen example, is it's really, really hard to extrapolate from something that's in a Petri dish or a study that's done a mouse to how that will behave in humans. So there's really no substitute for the high quality human data that kind of underlies this ingredient. And so I got really excited about this and then I started asking around amongst my dermatology colleagues like, "Hey, have you heard about this?" and was really surprised to learn that for a lot of people, this was something that they incorporated into their sun protection regimen. So they were using sunscreen. They were using hats, and they also had this polypodium leucotomos on board. So it was something that then I started incorporating to my own sun protection regimen. And it was really as I kind of went through my time as a dermatology researcher that I just became very, very passionate about this ingredient and what it could do as an additional kind of tool in the sun protection toolkit. And it was really meeting Chris and having his deep understanding of consumer products and storytelling and how to really take things that are science and then bring them to actual customers that we kind of teamed up to form Sundots as we did it today.

Chris: And at the same time, I had spent a year and a half working with academic researchers in the Boston area looking at science commercialization. My observation was that there's a remarkable amount of incredible work done at research institutions around the world for which there is a compelling paper is it advances the researchers' career here and then the paper sits on a shelf. And it's really in the transition from fundamental science to actual products and services where I saw the opportunity to have impact. My career has largely been a process of seeing how business can really make a positive difference and how businesses can be run in better ways than what the stereotype is. And so seeing this great opportunity for science in such an amazing



city like Boston for research was what got me excited to look at entrepreneurship specifically at the intersection of consumer products and health care challenges.

I met Dr. Javorsky through the Boston science commercialization community. We worked together on a different product for a while, which is how we got friendly. And then she was kind of like, "Hey, like I got my own ideas too, FYI." Told me exactly what she just shared with you. I had recently had a daughter and so was newly familiar with the challenges of wrestling kids into sun protection submission. While kind of her explanation of the need for sun protection has certainly only redoubled my interest to make sure that they do get it on them, also seeing what she just described, a remarkable body of high quality of evidence around an ingredient that could be a complementary approach was something I can definitely get out of bed every morning for. She was looking for a kind of commercial, business marketing co-founder. I was looking for a brilliant scientist co-founder and we were really encouraged to find the other through the Boston scene. And amazingly that was only about a year ago. It's been a pretty wild year of putting the product together and starting to see what a difference it can make in the lives of our customers.

Katie: So what other compounds are in Sundots besides just the polypodium leucotomos? Are there other ones that work kind of synergistically with that and what are they doing to the cells in the body to create that effect?

Dr. Javorsky: Yeah. And that's something we can certainly get into as well or like, well, polypodium leucotomos is one ingredient that has sort of the gold standard and has the really the strongest data behind it. But what else has been studied is also really interesting question. For our product, we have formulated our Sundot...our polypodium into a daily gummy. And we also formulate that gummy with vegan vitamin D. So it's something we were talking about earlier, that tension between sun exposure and getting vitamin D kind of on board, we decided that it was important to formulate any sun protection oral supplement with 100% of your daily value of vitamin D. And for this particular product, we chose a vegan source of vitamin D. So it comes from lichen from the U.K. to sort of have that as...to kind of complete your sun protection sort of toolkit because we know that vitamin D deficiency is a big problem in the U.S. because we don't get a lot of sun. And even in the...sort of we have those winter months where we don't see any sun pretty much. So that was really important to us that if we're going to be really evangelizing people to use sun protection, that we were also providing them with their vitamin D.

Chris: An essential philosophy of ours from a product development perspective is not just what do we know about a given ingredient but how can we follow that ingredient through a deeper level of understanding through to real outcomes. A kind of dirty secret within dietary supplements broadly is that, for example, we may have a great understanding that vitamin C is really important for our body, but it's often very, very difficult to establish any kind of causal relationship between a supplementary form of an ingredient and the actual outcomes that we care about. So, true vitamin C is great. Not really all that clear whether taking vitamin C as a supplement actually results in anything good for people. And so for us, that's kind of our North Star, is not just what ingredients are there good kind of first principles evidence around, but what ingredients can we actually see actual compelling outcomes in a supplementary form. Vitamin D is one of the few ones that really is visible, and so whether it's because our customers are kind of concerned about vitamin D deficiency or because as Dr. Javorsky mentioned, we just know that a remarkable portion of our population is deficient,

that's something we could feel really good about including because we know it's much more likely to result in actual changes in people's lives, which is ultimately what we're looking for.

Katie: Absolutely, that's such a great point about we do have so much data on vitamin D and how important it is for so many things within the body. I think even a risk of a lot of cancers goes down with adequate vitamin D. And thankfully, it's also one that's easy to test for, like you mentioned, vitamin C or even things like magnesium, it's much more difficult to test the body for the levels of those or to see an exact reaction, but with vitamin D, we can easily test the body to know what the levels are and optimize those. In fact, that's something even with my kids that I do on a yearly basis, is an easy finger prick, like one blood spot test for vitamin D, just because like you said, the data is so strong about vitamin D deficiency. And I think that's because it's fat soluble, and maybe you can speak to this as well, you don't wanna overdose it. You wanna make sure you're getting the right amount but not too much. So for me, I go back to testing and making sure that we're all getting enough but not too much. But can you speak to that a little bit more about because there is a sweet spot range I believe with vitamin D.

Dr. Javorsky: Totally. And that's also why we just formulated our product with 100% of the daily recommended value. When you look at some of the vitamin D supplements out there that are like 2,000, 4,000, 5,000 IUs, you'll see these on the bottle, those are way, way too much. Those high dose vitamin Ds can be good for someone who's deficient and is trying to kind of get back up to a baseline to really kind of boost themselves, but it's not really what you need for maintenance. And as you say, being a fat soluble vitamin, it is something that can build up in your system. And so that's something else we're passionate about, is educating people on where is that sweet spot. And it's kind of a concern for being throughout health and wellness and biology is that there is such a thing as too much of a good thing. And there really is that sort of window of the optimal dosing, whether it be from foods, whether it be medications, whatever it may be that gives you kind of the best effects for your body. So too little is not good and too much is not good. And how do we educate people and give them sort of the tools and behaviors to get to that spot where it's just right.

Chris: And that also comes back to one of the things you first mentioned, Katie, which is personalization. The challenge of doing science historically has been a fundamental reliance on population scale data because we just haven't really had great tools for parsing out at kind of individual level insight. And that's still in its infancy, like we don't wanna pretend like the days of personalized nutrition have arrived. But certainly, today versus 10 years ago is a night and day kind of way where we can understand our own bodies. And even the kind of premise that there is one amount of any...of sugar, of saturated fat, of vitamin C, it's kind of laughable when we look at the variety of humans that we have to summarize all what we know into like the recommended daily value. We're also sympathetic like to the FDA and other organization that have to do their best to give a broad recommendation because to say, like, get a whole bunch of out-of-pocket tests done to establish your own numbers before you even consider about what you need isn't feasible for a lot of people as well. And that's why we too are really excited for what the future will hold for where we can better understand our bodies enough individually that it's not X for everybody, but it's X for you and Y for you and Z for you because we are different people.

Dr. Javorsky: Yeah. And just to add to that on that personalization point, that's why with every single dietary supplement that's out there, our dietary supplement with Sundots, whether it be a vitamin D supplement that's on the shelf, it always has that recommendation that before starting any supplement, you should speak

with your doctor and consult your doctor. And that's something that we believe really strongly you should do before starting our product. That's why it's on the label, is because that's the person that's gonna have the sense of what might be right for you on a personalized case. And so that's not a label that's just kind of there as boilerplate language. It's there as something you should absolutely do to have an understanding of what is the right thing for you and your body. And I think it's also great to have those conversations with your doctor because it's something we don't talk about enough, are kind of like what are the wellness practices that we do? What are the supplements that we take? What are the things that we eat? What are the things that we put in our bodies? And I think having someone who knows you, knows your health history, having that conversation is a really positive thing even if you're not taking any supplements or anything like that to understand what you can do from the behavioral side to improve your health.

Katie: Exactly. That's such a great point. And I probably should make that disclaimer that we work with a couple of doctors who understand our full medical history and we've tested all of our kids' genetics. We know they have mutations and we've, like I said, tested their blood. So we're supplementing with vitamin D carefully. And you guys are in that sweet spot range where you're not gonna get a toxicity, too much vitamin D from the amount in Sundots. That's a great point. Don't just throw things at the wall and hope they stick without checking with someone who knows what's actually going on in the body.

This episode is brought to you by Organifi and I'm so excited to finally tell you about them! Because, here's a confession... I have known about Organifi for a really long time and even though so many of my friends and experts I trust rave about them, I never tried their stuff until recently because I thought... first of all, how can it actually be that good? Well, I tried it and it turns out that it is not only that good, it's better than I expected! Organifi has green juice, red juice (which is an antioxidant red drink and it's delicious) and a golden milk turmeric drink, along with a plant-based protein. Everything they have is completely organic and they all actually taste good, unlike a lot of other green drinks and protein powders. I've especially been loving their red juice lately... especially at this time of year for immunity. It tastes amazing and it has a blend of antioxidants from strawberries, cranberries, blueberries, pomegranates and they also add in beets, cordyceps, reishi, rhodiola and a lot more. So, this particular blend is formulated to increase energy, boost metabolism and reduce factors that lead to aging. Their green juice is minty and delicious, and I noticed it has almost 800 5-star reviews. You can check out those two products, along with their whole suite of products and save 20% just by being a listener of the Wellness Mama podcast. Go to <http://organifi.com/wellnessmama> and use the code: WELLNESS20 for 20% off.

This episode is sponsored by Four Sigmatic, a company whose delicious drink mixes I use daily in some form. I've been fascinated lately by studying the benefits of medicinal mushrooms like Chaga, which has more antioxidants gram for gram than anything else on the planet. So one serving for instance has the same amount of antioxidants as 30 pounds of carrots. Crazy. Cordyceps which is great for the immune system, Reishi which helps promote restful sleep, and Lion's Mane which is thought to promote focus and brain health. Four Sigmatic takes these superfood mushrooms and blends them with coffee for a brain boosting jitter free morning drink. They also have a line of delicious elixirs that are caffeine free and great for any time of the day. I almost always end my day with a warm cup of their Reishi, which makes a noticeable difference in my sleep quality and I often begin the morning with a cup of the coffee with Lion's Mane. My kids love their superfood hot cocoa and I love that the Reishi helps promote calm and sleep! You can check out all four stigmatic products at [foursigmatic.com/wellnessmama](http://foursigmatic.com/wellnessmama) and save 15% with the code wellnessmama.

Katie: And you mentioned food. I love that you brought that up, but I'd love to go a little deeper on this, because to me, if one compound like the polypodium leucotomos can protect the skin from the inside out, we know that others can as well. And my background is in nutrition, not medicine. So I always tend to take the food first approach. But I'm curious if in your research, you've come across either personally or scientifically things we can do from a dietary perspective to just help protect our skin along with something like Sundots.

Dr. Javorsky: Yeah, absolutely. So in looking through the research, again, using that kind of standard of having multiple human clinical studies that have been done on a particular ingredient, there isn't anything that really kind of stacks up to polypodium leucotomos at the moment. However, there is lots of research happening on other levels, so looking in the petri dishes, looking in animal models about a variety of different antioxidants that can be used to potentially protect your skin or just to give you sort of general health benefits across the board. So we know that antioxidants are things that are very, very helpful for our health. We think of things like all of the different berry families. We think of things like green tea. You mentioned astaxanthin, which is an algae sort of extract. So there's lots of things out there that have the antioxidant capacities. There's no necessarily great study or a piece of data that I can point to that shows a strong sun protection benefit, but there are sort of promising what we call preclinical studies that show that these things can be very, very good for skin health. Vitamin C as you mentioned, Chris, that's another one. There's a whole family of things called carotenoids or beta carotene or things that are like in carrots. That's where the kind of name is derived from. So there are plenty of things that you can eat that are good for your overall health and then may also have benefits for your skin. And it's just they haven't been tested to the same level of rigor yet that the polypodium has been.

Chris: And anytime we're considering a choice like this, the flip side of benefit is always harm. What's great about lycopene, which you may find primarily in tomatoes is like tomatoes probably aren't gonna hurt you. Even if you're wrong about any kind of antioxidant benefit there, they're good for you in other ways, like they're a vegetable, vegetables are good for you. So we don't...like we're not gonna talk down to somebody who gets passionate about maximizing the nutritional value of their diet. That's awesome, like I do that too. I think where we wanna caution people is exactly what Dr. Javorsky said, to acknowledge that there are different levels of quality of evidence. That is always changing as well. Thirty years years ago, we would say, "What's this polypodium stuff? Like somebody should do some research on this before you start taking it." As far as we can tell, the fern has been effective long before the studies were done. But that is always the tension, is what do we want from things and what is the risk? In this case, many of these examples, you know, lycopene most famously comes up, very low risk, so like thumbs up to tomatoes. Just probably would not rely on it all that explicitly as something that will meaningfully move the needle for you from a sun protection perspective.

Katie: That's a great point and something I'm trying to be very careful about when I'm writing online, because like you said, some things have a lot of anecdotal evidence or historical evidence, but they don't have the scientific proof behind them but at the same time like our grandmother didn't need a study to know. Like we should probably eat things like blueberries or tomatoes or vegetables, like there's also the common sense aspect. That's such a great explanation of that complementarity of do what we know the science is saying works but also eat a good diet and make sure it's well-rounded and nutrient dense. And I think the science especially doesn't ever say you should not eat a nutrient dense diet. That's a great point about the burden of truth for sure.

Dr. Javorsky: Yeah. And I think that from that science perspective is there really is now...I think we're living in a very exciting time where there is increased focus now on sort of health prevention and wellness and what we can do to sort of keep ourselves well before we get sick and prevent getting sick in the first place. And I think that's really kind of started to funnel a lot of research interest and also research dollars to better understanding how our diet and how things that we put in our body and how different supplements can help us sort of promote wellness. So I think that in sort of coming years as research intensifies in this area, we'll start to see some exciting breakthroughs and data coming out about other things that we can do for our health.

Chris: And from my work in science commercialization, I met a ton of researchers who are also acknowledging that, "Hey, I got into this because the purpose of doing research is to help people. If I don't connect better with entrepreneurship, with the private sector, with products and services to like inform those questions, I'm not really like doing my job either. I'm not accomplishing what I want to." And so I see a great opportunity for the cycle time between anecdote or kind of cultural evidence to cycle into a more clinical perspective. I'll give a specific example. I remember a number of years ago, all over the news was this whole like microwave your kitchen sponge because it kills the bacteria that could grow in this like wet, moist environment. And certainly, we can have a whole separate conversation about skin microbiome and which of those are actually bad for you or not. But putting that aside, hey, killing the bugs in your sponge seems like a good idea. Within like two or three years, someone had actually done some research that basically showed, yeah, when you microwave those sponges, it kills all the weaker bacteria and it's basically a sort of MRSA kind of context where like the superbugs, they're just like left to flourish in your sponge. And those are the ones that really spread. That may not like make or break my health goals, but nonetheless, it was an encouraging example to me of how academic research is also responding to conversations that are happening in kind of popular media in the wellness world because they both have something really valuable to offer. Our whole worldview at Sundots is not that like only clinical research is the source of all insight, but it's the back and forth that matters. And I see great, encouraging indicators that the closeness between these two communities is gonna grow over time.

Katie: I'm hopeful of that as well. And that's such a perfect example with the sponges. And I know also even in the news a couple of years ago, the same thing applied like overuse of antibacterial hand soaps because it was kind of that saying things like, "Oh, germs are bad. Let's kill all of them and everything." And then realizing, oh, actually, we're just killing the weaker ones and some of these superbugs are becoming stronger because we're not able to actually treat them and they're getting resistant. So that's such a great point. And like you, I'm hopeful. I truly believe that entrepreneurs have a lot of ability to change a lot of these outcomes that we're seeing in these problems that we're seeing. And I love when I see teams like you guys who are combining both of those entrepreneurship and the deep science and how those can work so well together.

One more point I'd love to touch on, if you guys have seen any research on it, is the idea of essential fatty acids or fat soluble vitamins and what role, if any, they can play in sun protection because that's something else I came across it just my own research years ago. And I'm curious if there's any new research or any contradicting research but just about the importance of getting the right kinds of fat soluble vitamins and beneficial fatty acids to keep the skin healthy both from an aging perspective and the sun projection perspective.

Dr. Javorsky: Yeah. So I think that as we talked about earlier, there's certainly some research on essential fatty acids and different types from the kind of what we call, again, the preclinical side. So things that are done in Petri dishes and rodent models that show that there may be some benefit. I think where the really interesting sort of data is behind those particular ingredients comes with systemic inflammation and calming down systemic inflammation and also for cardiovascular health. So I think that these kind of fall into a similar category of what we're talking about before as things that we don't really have the data or know if they really, as Chris says, moves the needle on the sun protection arm, but there's pretty good data out there that these are things that are very good for your health and probably should be incorporated into the diet. However, that area that I'm most familiar with is for our kind of the cardiovascular health side and then also the systemic inflammation side of things.

Katie: Got it, cool. So back to Sundots, I wanna make sure we talk...I know that some questions I've gotten about that specifically related to can kids take it, can pregnant women take it? And I know all of that is through the lens of ask your practitioner. But based on the formulation, do you guys have any guidelines for who could take it?

Chris: Yeah, definitely. So as you can see on the bottle, if you're a customer, it says 12-plus. And as we've reiterated, talk to your doctor, is not just like a casual or lawyers made us put it there thing, like that is important. Right now there is no specific evidence that any of our ingredients are harmful whatsoever to kids. Basically, besides the polypodium we mentioned, the vitamin D we mentioned, the rest of it is basically a vegetable. It's tapioca. It's kind of a potato, is the best normal ingredient that people associate tapioca with. But out of an abundance of caution, we are labeling it for 12-plus right now. This is what's so great about living in America and also what can be really challenging is that we are a litigious society, so that's why 12-plus for the time being, not for any particular concern. Zero evidence that anything there is dangerous. But being a small company, we wanna play it safe. And so that's why for our first product, that's where we've started. If folks are interested in a kid's product, please reach out, like that's the kind of feedback we always need. It's something, as a parent, I've already mentioned that something I desperately wanna see and we would hope to have one in the near future for sure.

Dr. Javorsky: And part of that sort of comes down to the fact that children are not just tiny humans. So their bodies just behave in different ways. They do require in sort of the pharmaceutical world very different dosing than you would give to someone who is an adult. And so for that reason, we think it's really important for us philosophically and personally to do proper research on sort of pediatric dosing as we say. But as Chris says, this is something that's a conversation that you should certainly have with your pediatrician if it's something you're interested in or with your own practitioner if it's something you're interested in and bringing on board for yourself Sundots. So that being said, something we're really interested in, the kids side of things, but also something we wanna wait till we have the right research on as well.

Katie: Great to know. Okay. And I'll make sure that... I know you guys have written about a lot of the topics that we've talked about as well as obviously, people may be interested in finding out about Sundots, and all of those links will be in the show notes at [wellnessmama.fm](http://wellnessmama.fm). So if you guys are listening while you're running or driving or don't worry about writing it down, just check them out when you're at a computer. And an unrelated question that I love to ask toward the end and I really am excited for your guys' answers is are there

any books that have really had a profound impact on your life or your research that you would recommend because I'm an avid reader, so that's a somewhat selfish question. I'm looking for ideas.

Chris: I'll go first. Yeah, not a super novel example but "The Lord of the Rings" books have been really influential on me. My daughters named Eowyn, she's the one who stabs the Nazgul in the face. So that tells you something about what I aspire to for my children as regards how they interact with the bad guys in the world or kind of evil forces in the world. And that's kind of just broadly because it's a story about people who have like not a lot of special power or strength or stature, like accomplishing pretty amazing things primarily just through like persistence and faithfulness. And I often do not feel particularly powerful, and so I love the story that it tells about doing the best with what you've got, relying on your friends, and being able to accomplish something great for that commitment.

Katie: Yeah, cool.

Dr. Javorsky: And on my end a book that I really love and I highly recommend for people to read is a book called "The Power of Myth" by a guy named Joseph Campbell. And he was a really cool guy that did a lot of work in what's called comparative mythology. So he went and looked kind of all around the world, different religions, different storytelling traditions and saw that there are kind of themes that keep coming up. And part of the reason I love that book so much is it just reminds me that we're very much kind of a storytelling species so to speak. And I think that's something we forget a lot in the medical world. And when we sort of develop new tools for how, when we develop new scientific tools, is that developing the tool is half the battle, but you also have to learn how to tell the story behind it and communicate to people what it is and why it's important and put that in a context that's meaningful to them in their everyday lives. So, that's one that I...it's not a sciency read but I think it's a fun one.

Katie: I love both of those suggestions. Thank you guys so much and thank you for your time. This has been so fun. I can't believe we've flown through an hour already. But I just really appreciate both of you taking the time to be here and all the work that you've done in the research side of this and the development side. I know that's not an easy process. And I'm very appreciative.

Chris: Thank you. No one sees that part of the work. And you're right, it's not easy.

Dr. Javorsky: Yeah. And we really appreciate you sort of taking the time to have us. It's been really an honor to be here and have this conversation with you today.

Chris: Thank you.

Katie: Thank you and thanks to all of you for listening. And I hope to see you again next time on the Wellness Mama Podcast.

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