Announcer: Bulletproof Radio, a state of high performance.

Dave: You're listening to Bulletproof Radio with Dave Asprey. Today's cool fact of the day is that your hair doesn't keep any secrets. It turns out your hair contains information about pretty much everything that's been in your bloodstream including drugs, heavy metals, and is one of the most commonly used types of forensic evidence. But one thing that no one can tell from looking at just your hair is whether you're a man or a woman because men's and women's hair is identical in structure. But if they get the follicle, they could probably genetically sequence that.

Dave: But your hair shaft itself is made up of keratin which is the same protein that horns, hooves, claws, feathers and beaks are made of. Studies in Fiddle Nile crocodiles, bearded dragon lizards one of which I had as a pet as a kid and corn snakes appear to have several long-standing debate on the rise of skin coverings, special skin bumps that we've known for a long time direct the development of hair in mammals and feathers in birds also turned out to signal scale growth in reptiles which means all three of them evolved from a shared ancestor at least that's according to a study in 2016 which is kind of cool and kind of creepy which means maybe someday we'll be able to transform your hair cells so you can grow scales on your head. Would that be cool or what? Talk about having controlled [inaudible 00:01:28] biology, I think it'd be awesome to have a bearded dragon tuft at least for Burning Man.

Dave: Now, today's guests might have been the Burning Man. She's an expert. She's a physician from SUNY Downstate Medical School in Brooklyn where she studied dermatology. She's an expert in hair. It turns out a lot of people really liked the last podcast number 420 where we talked about ... No, that was not at Burning Man joke. It actually was Punk number 420 just so that's clear. It wasn't Elon Musk joke either, but what's happening is everyone saying, hey, I want to know more about here.

Dave: There's such a focus in a lot of medical studies on men and a lot of advice that it turns out is different for men and women. I thought I would do a podcast that was focusing on hair growth that's applicable to both sexes, but that had a little bit more detail for women because hair changes during pregnancy, during puberty, during perimenopause. Women can have problems with hair loss, hair thinning and things like that.

Dave: Plus, I'm planning to live 180 and I'd like to not be bald during that time. I'm hoping I pick up a few tips myself. Dr. Kogan or Sophie also has a personal story here because she had hair loss due to an eating disorder and just the stress of medical training. It turns out stress and hair loss are integrally linked. She's the chief medical officer of Nutrafol, a company that focuses on science behind hair loss and what you can do with plant compounds and naturally occurring things to take control of that.

Dave: Sophie, welcome to the show.

Sophia: Thank you, Dave. I'm super excited to be here to talk about a topic that is very dear near and dear to my heart and to share a lot of the news in the science that we've been learning here at Nutrafol.

Dave: I'm doing to boil it down to a single question. Why do people lose hair? That one answer was 7000 hours. Give me the top level like what's going on with hair loss?

Sophia: People lose hair for a multitude of reasons. The thing is that there's no one cause. That's one of the things that's different about how ... of an integrative perspective versus a Western medical perspective. We're always looking for this one cause of something. That leads to targeted drugs that target only single pathways. For instance, for hair loss today, we only have two FDA-approved medications. That's finasteride used for men and minoxidil commonly known as Rogaine used topically for both men and women, but finasteride, it targets androgen synthesis.

Sophia: For those who don't know, androgens are male hormones. The one that's implicated in hair loss the most is the dihydrotestosterone which is a more potent form of testosterone. Over the course of the last 30, 40, 50 years, we thought that DHT is the only implicated pathway in hair loss, but now, research shows that that's not the case, but basically, there's inflammation, that there's stress, there's environmental assaults and more and more as research evolves and there's a huge surge in research today because it's such as such a great area of interest is that there are innumerable amounts of pathways.

Sophia: The number of signaling molecules and pathways that are responsible for both hair growth and hair loss are so many that it would be impossible to think that there's one targeted intervention of one cause in itself. Any dysregulation to those pathways will cause hair loss. It could from multiple factors.

Dave: Now, finasteride is something that is a very potent thing that can mess with men's hormones not just around hair loss. There's actually support groups online for a smaller group of men who take it and just permanently have almost neutering of their sex hormones with some big problems from that. That's something that I'm not planning to add to my regimen even if I decide to go down a pharmaceutical route to make my hair stay in as I age beyond what you're supposed to age because of that risk. Does minoxidil for men or women represent the same kind of risk?

Sophia: No. It represents other types of risks. For instance, minoxidil was initially discovered to grow hair. Just like anything else, it was an accident. It's used as a antihypertensive medication. It can actually, in larger percentages or larger dosages, can even cause heart palpitations and hypotension depending, but mostly a lot of people experience irritation and scalp irritation or inflammation as a result of it.

Sophia: Also, because it is the only … Well, not the only, but it's the "only Western" medical drug that is allowed for women, women don't like putting things into their hair. It is very challenging actually. For those who use minoxidil, do you know that there is some residue that's left and also they kind of messes with your hairstyle. There's different types of implications and side effects for minoxidil than finasteride.

Dave: You can keep your hair, but it'll be greasy and limp.

Sophia: Exactly, yes.

Dave: That's not something that I think any of us want.

Sophia: Or it can cause irritation. That's something that actually makes a lot of people stop. Compliance is a huge issue with minoxidil.

Dave: Those two solutions are also targeting single pathways. From my understanding of follicles which is probably not at your level, there's definitely a mitochondrial component. There's a hormonal component which is a big part of it. There's progesterone. There's cortisol. There's all these different things.

Dave: For someone listening to the saying, look, I want my hair to be just thicker and not fall out like give me the CliffsNotes given that we're looking at potentially hundreds or thousands of variables, what are the top three variables to pay attention to?

Sophia: I think that the top three variables are stress, inflammation, and hormones. Stress can have a range of implications. It doesn't just involve direct effect on the follicles, but it also dysregulates other systems in the body that help the follicles grow. Stress is a huge, huge, huge component of this.

Dave: How do you define stress.

Sophia: Excellent question. I think we all think of stress is something that happens acutely. Of course, our bodies have been wired to respond to this with a sudden surge of adrenaline and cortisol. It's all very important because that's how our body responds to a sudden stress like if a bus is coming your way, you need to run away so the body will mount a response. That's an acute type of stress.

Sophia: I think what's more important today than an acute stressor because I think life-threatening events are rather rare. We're no longer being chased by lions or tigers on a regular basis. We don't live in cage. Your stress doesn't come from the same type of life-threatening events, but your body responds the same. The stress that is affecting us today is almost a constant state of arousal.

Sophia: It's basically a chronic level of stimulation. Whether it's the boss yelling at you at work and compounded by you waiting in traffic for a couple of hours, compounded by you having to deal with your spouse or the deadlines or rent to pay the next day. Most importantly, I think in today's society than anything than even 10 to 15 years ago is this constant connection.

Sophia: We're no longer able to disconnect from anyone even from ourselves. Constantly, our brain is constantly aroused. For instance, we never put that phone down. Speaking of Burning Man, that's one of the places you go to disconnect. It's the one place where you don't actually have a tie to the outside world which is much gratitude for that. I just experienced it for a week. I wasn't responding to emails or text message. Nobody could

reach me. Thank God for that, but normally speaking, you have your phone. You take it to the bathroom. You answer all these messages.

Sophia: I mean there's not a single moment in time when you're not connected. That's the kind of state of arousal that I think is affecting us on a chronic level today. What's really important is that stress doesn't have to just be psycho-emotional. We're thinking of psycho-emotional stress as being constant state of arousal, but also there's chemical stress from chemicals that we find in food or toxins and pesticides. There's environmental stressors like smoke and xenoestrogens. There's nutritional. We don't have enough vitamins and minerals in our soil.

Sophia: All those are stressors and, obviously, like physiological and environmental, so all of these things compound because the body's stress response is basically to is to adapt to all of these stressors. It activates the HPA system by pituitary access. It activates the sympathetic nervous system. It impacts the immunological response. It impacts hormones just so that you can adapt. That process of adaptation happens over time until you kind of exhaust your resources because there's a finite amount of energy that is left for you to respond to these stressors. That's what we call adrenal fatigue and adrenal dysfunction or adrenal dysregulation.

Sophia: To me, today's stress really means that you're constantly adapting. Your systems are constantly adapting. They're overtaxed. There's an over-exaggerated burden on them and wear and tear. Even if you're not physically feeling or if you're not thinking that you're stressed, your body is still physiologically trying to adapt to these many different changing environmental factors and psycho-emotional factors.

Sophia: That's what we call the 21st century conundrum. Most people are either in adrenal fatigue or on their way to adrenal fatigue in today's society. I think that's really where all of these chronic diseases are coming from. You have a rise in thyroid. Disorders arise and autoimmune disorders arise in hair loss especially in women.

Dave: Tell me about what stress did to your hair.

Sophia: For me, I'm genetically predisposed. Like I said, there are multiple factors that are implicated in hair loss. Genetics, of course, play a role and genetics play a role in everything, but there's a strong component of epigenetics. For me, the stress was the epigenetic component that brought my hair loss into progression into manifestation.

Sophia: Initially, I stress myself by having an eating disorder in the 90s like a lot of teenagers did. That kind of triggered the progression of this. I lost a lot of hair which ultimately didn't come back fully until much later in life. Then, I noticed that over the course of my life, it was either college and medical school and then residency and I did another residency, those were the times that I would shed the most. Those are the times that I would lose the most amounts of hair.

Sophia: Of course, even though I'm genetically predisposed to losing hair at that genetic manifestation came out during those times. My stress didn't just come from exams. My

stress came from the fact that I was really bad in college, in medical school. I lived and survived on Coca-Cola and candy and coffee and tuna fish which, of course, has a lot of mercury. In addition to the psycho-emotional stress of studying for exams and in residency not sleeping and all those things that compound, I also had a lot of toxins in my body and a very dysregulated and compromised gut.

Sophia: As a result, of course, I manifested in a lot of hair loss. Recently, there was a study that came out in 2017. Actually, they tested female medical students specifically to see what happens before exam time, during exam time and after exam time to see what effect stress has on their hair follicles. Of course, they found that there was a shift in pro-inflammatory markers as a result of stress. They saw that there was a heightened Th1 response so more inflammatory cytokines such as interferon gamma and TNF alpha.

Dave: After stress, how soon do you start seeing hair shedding?

Sophia: Again, there's a difference between acute stress and chronic stress. There is such a thing called telogen effluvium. That's a diagnosis that Western medicine does recognize as stress-related. That could be a physical stressor or a psycho-emotional stressor.

Sophia: What happens is that, normally, a hair and follicle cycles through a growth phase which is we called antigen, regression phase catagen, and resting phase telogen. Then, it goes into exogen which is hair fall out. Unlike animals that have a synchronized cycle, so for instance, animals can shed all of their fur at the same time seasonally and then grow new fur, our cycle is not synchronized and still lucky for us because we're not shedding all of our hair going balding and regrowing it.

Sophia: All these hair follicles are in different stages and have a very finely-tuned biological clock. Each hair follicle, imagine this, has a very own biological clock that tells it when to go into each phase of the cycle. When we suffer from an acute stress such as an illness a surgery or a death of a loved one, a breakup or maybe a big move or something like that or sudden weight loss, the majority of the follicles or a big portion of the follicles suddenly are shifted into the resting phase, telogen.

Sophia: That's very logical because when they're stressed, the body will focus all of its energy on essential organs and disregard the follicles. The follicles are not essential for survival. It's a kind of survival mechanism. That's not where the energy goes. As a result, all of these follicles shift into the resting phase from which point there's no way back. About three to four months that's how long the resting face last, the follicles will fall out.

Sophia: If you ask somebody, somebody comes in and they're suddenly shedding clumps of hair, the first question you ask them all, "Well, did you have a stressful event within the last six months?" They'll tell you yes. Likely, they'll tell you something happened. That's acute stress. That's what we called telogen effluvium.

Sophia: Now, more and more today, we see chronic telogen effluvium and other types of hair loss where the etiology Western medicine still scratches their head a lot about, but in reality, everything points to the fact that that ideology is due to chronic stress. Where

it's not an acute stressor, that is suddenly pushing all these follicles into telogen and then hair loss, it's actually this chronic state of arousal and dysregulation of adrenal function and other hormones that's playing a role.

Dave: That makes sense. It could be a short period of time afterwards if it's an acute stressor and if it's a chronic stressor just tends to happen through all the different hair cycles.

Sophia: Exactly. With chronic telogen effluvium which is on a rise today, the process just continues. People continue to shut and also the same thing with male and female pattern hair loss. Of course, they're implicated pathways and that how stress affects that's a chronic stress will definitely affect that type of hair loss that's more insidious. You don't see the shedding right away. You don't actually notice it until about 50% of the follicles are affected.

Dave: Can you cause follicles that are affected just by thinning or shedding? Can you make them wake back up? Can you recover them, restore them, turn them into super hair follicles? What hope do we have?

Sophia: Absolutely. The key is to restore the body, to restore the body and by restoring the body, restore the follicles. Every organ has an ability to heal itself given the proper conditions. This is what you talk about all the time, the biohacking. Having the ability to counter, to support the adrenal glands, to decrease cortisol levels, to decrease inflammation or the rebalance cortisol level, sorry, to decrease inflammation counter oxidative stress and the hormonal imbalances, you will ultimately rebalance the environment of the follicle and the systems of the body support them and as a result, support the follicle in its recovery.

Dave: Is there lab tests that people should get to know if cortisol is high?

Sophia: There's many lab tests you can do. It's not that the cortisol is high. Sometimes, cortisol is high and sometimes cortisol is low. When somebody has been producing cortisol over a long period of time. eventually, the adrenals get fatigued. Then, there's the less production of cortisol. But then, there's whole other slew of issues that happens.

Sophia: The key is to actually see where that system is dysregulated. You can just celebrate cortisol test. We also in our here at Nutrafol, what we do is we've implemented something called the hair mineral analysis test. We help our customers figure out what are the stressors that are in their system actually looking at the hair itself.

Sophia: The hair mineral analysis looks at a variety of different minerals and heavy metals and the patterns and so it can actually tell you what organ systems may be stressed.

Dave: If you had to guess, what percentage of hair thinning or hair loss is caused by toxic heavy metals? I know this is a guess, you probably can't reference a single paper or anything like that. Just from clinical experience, I mean do you think it's 5% or 50%. Is it big or is it small because you guys are getting data on hair minerals which includes heavy metal.

Sophia: It's actually a really good question. We're still accumulating the data, but I think that's the uniqueness of having this sort of mind, inquisitive mind as we're still trying to address and figure out all of these things for our customers and ourselves to bring back to the Western medical community.

Sophia: What I do know is that the major things that we found are dysregulation of cortisol so stress, the adrenals, thyroid absorption so the gut is impacted by the stress and heavy metals, but I would say I think at least 60% to 70%, we find heavy metal toxicity.

Dave: What are the most common heavy metals you're finding in people with hair that's falling out?

Sophia: We find a lot of mercury, a lot. A lot of mercury. It's very hard to chelate out of the body. I tested myself. I haven't really eaten. I mean I'm not that great, but I do limit my consumption of tuna and raw fish, but going back to medical school where in college where I pretty much lived on tuna fish my entire like what is it 10 years of my life, it's still there. It's very hard to get rid of mercury. We sometimes find lead also aluminum from ...

Dave: Deodorant.

Sophia: Deodorant use, yeah, antiperspirant use. We actually within our office itself, I just did a little test myself and every single person who came back with aluminum elevated was a person that was using deodorant.

Dave: I just have to do a public service announcement right now. If you have aluminum or alum as they like to call it in the fancy brands like the stuff with crystalline things in it, and it says antiperspirant, you're doing it wrong. That stuff is linked to all sorts of problems including Alzheimer's and it's a mitochondrial dysregulated which is why it would be linked to Alzheimer's although it's not the only cause of Alzheimer's.

Dave: You just don't put that in your armpits because the armpits are where you put hormone cream so they absorb into your system really well. Use good old-fashioned deodorant that doesn't have a lot of synthetic crap in it, things with essential oils and natural ingredients. If you still smell really bad or you're sweating a lot, you have other health issues to get on top of.

Dave: Since I went bulletproof, I can go four days without taking a shower. I don't grow body odor. If I eat the wrong stuff, I get body odor. When you get your system toxicity low and you stop eating things that piss off your gut, you actually don't smell bad. That said, I still use deodorant, but it's a very different thing that when you're soaking through your shirt and things like that. If something's not quite right and you want to start looking at hacking your biology so that your body is comfortable and you don't smell bad because healthy animals don't smell bad unless they really don't shower. Back to today's regular scheduled program.

Sophia: I just want to say eight days of Burning Man, eight.

Dave: Nice. Obviously ...

Sophia: I don’t know if that's a good thing.

Dave: You didn't have an RV with the shower. I was [crosstalk 00:23:55] Burning Man this year.

Sophia: No. Just for those people who are listening, I use crystal deodorant. I don’t know how you feel about that.

Dave: As long as it's not an aluminum crystal, you're getting ...

Sophia: Absolutely not. No. But I think it works really well. You don't limit the perspiration, but you do limit the smell.

Dave: I've sent a variety of healthy deodorants or pit pastes out in the biohacking box. I sent a box out every quarter for people who are just into the stuff [inaudible 00:24:25] I find really cool products and I get them for less. It's at my website biohacked, B-I-O-H-A-C-K-E-D.com. You spend a hundred bucks a quarter. Then, I send you a couple hundred bucks worth of cool biohacking toys and just things they come across.

Dave: There's a variety of neat stuff out there that you can find. Just look at the ingredients. If it says alum or aluminum, it's not for putting on your skin or in your mouth. You're finding aluminum is an issue, but mercury is the biggest issue. The problem is if we don't eat fish, we don't get the omega-3 fatty acids. If you're short on EPA and DHA, what does that do to your hair?

Sophia: Well, first of all, these are anti-inflammatory. It helps mitigate the inflammation in the body. Obviously, as long as you're getting ... If you don't have a good balance of your omegas, you're going to have a pro-inflammatory state which will ultimately compound the hair loss issues. You do want to get those omegas, but you want to try to eat fish that is small.

Sophia: I think the key is to minimize consumption of large fish and tuna is large. Shark is large and most people don't eat shark, but you find shark and some supplements that even here are supplements. You need to be careful to minimize consumption of large fish. At the same time, you could consume fish, but use sardines or other small fish. I'm a big fan of sardines actually or take supplement with omega-3s.

Dave: What I like to do is I certainly solve it with omega-3s and Bulletproof has a really interesting new one that I think is out if not. I don't know. Maybe, I just dropped to talk to hint there, but I eat a lot of sushi when I travel because it's hard to find clean food at restaurants, but you can take things as stick to mercury when you eat the larger fish so that it doesn't get absorbed into the body, things like activated charcoal, bentonite zeolite, and other chelators can make a big difference.

Dave: The idea is getting it out of the body is hard. Keeping it from getting in when you eat something that has mercury, but also good stuff is the strategy even chlorella, these are

all things that I've been using for a while, and it seems to work. It's one of those situations where I recently went halibut fishing. If you catch a 50 or 100-halibut, the thing is 50 or 100 years old. I always throw those back.

Dave: The reason you do that is they make a lot more halibut babies which is a good thing for the oceans. Because they've been around that long, they accumulate a whole lot of mercury. They're not really good for you to eat. What you want to do is catch a young one that has had a lot less bioaccumulation, and it goes back to that smaller fish. If you do that and you're binding some toxins, I think there's room for a fish in the diet and a requirement for fish oil, but like you said, the collagen. You guys are including a small amount of collagen in the Nutrafol supplement because you're finding it's helpful for hair growth.

Sophia: Yes. Absolutely. I think the key here is also to include the good stuff, but also include the detoxifiers. We also have cattle. We also have item from Cal selenium and things like that that help detoxify the liver of mercury. Mercury will affect mitochondria as you know. Hair follicles require an exuberant amount of energy.

Sophia: When you have toxicity, it will ultimately not only affect the hair follicle directly because it compromises the energy production, but also will affect it indirectly by compromising detoxification of other toxins.

Dave: Other than going to Burning Man to disconnect, what can people with high stress and we have jobs, commutes, kids which you know they're wonderful are enormous stressors because they interrupt you every five seconds when you try to do something, what can all of us do to help stay on top with the cortisol?

Sophia: There are a couple of things. You're right about lifestyle modifications. I'm not saying that Burning Man is a lifestyle modification, but there's things that you can do definitely. Finding hobbies, I know life is busy, but finding even five minutes to meditate even or to do yoga or just to sit mindfully, what I try to do is, for instance, I pray on my food when I eat. I know that's kind of sounds crazy, but it's not a going to pray. It's more like a mindfulness moment. It's a moment when I just disconnect from everything else and stay tuned to the presence of the meal.

Sophia: I find the meal as a good habit for my situation for me. I tie my sort of moment of silence, moment of meditation to that process. Self-care is extremely important. We have to find time. It's important. We have apps now that we can use. That's really helpful. Lifestyle modifications, of course, good diet is important in eating healthy foods that are not inflammatory, protecting our guts excluding foods that are pro-inflammatory that stress our gut and ultimately contribute to the overall stress load for the body as well as taking adaptogen.

Sophia: I think adaptogens are extremely important. This is something that Western medicine has not caught on to because it doesn't fully recognize that the maladaptive stress response is responsible for maybe over 90% percent of chronic disease. We haven't yet as a medical society caught up to the fact that there are these wonderful botanicals gifts

that we have from mother earth that we can use and especially now when we have the technology available to us to extract those vital actives and make them more bioavailable and bioactive.

Sophia: Extracts like Ashwagandha. We use Ashwagandha, for instance, but there are others as well like [inaudible 00:30:07] or Reishi mushrooms and everything else. They have the ability to actually rebalance the stress response to support both the neurological stress response and also the physiological stress response which is kind of unique to them.

Sophia: They are also non-toxic. That's one of the definitions of an adaptogen is they're non-toxic, but they have an ability to re-modulate or rebalance further that have a directed action. They have a non-directed action. They basically help you build resistance to stress.

Dave: You include ashwagandha in Nutrafol as a supplement strategy, but if you're not at least meditating or taking deep breaths or doing something and you're tweaking in your lifestyle you might expect thinning hair.

Sophia: I think that you need to do all of those things.

Dave: I agree.

Sophia: I think taking ... We're all used to that's just kind of a way we think in the Western medical society or, sorry, Western society is that we take a pill and everything gets better. Yes, taking ashwagandha is important, but also implementing these small incremental changes in your life like you said gratitude, meditation, yoga, even joy and all hobbies to sort of decrease that stress or to mitigate that stress response are very important. Good healthy diet and these wonderful adaptogenic herbs and anti-inflammatories.

Dave: Talk to me about the female menstrual cycle and hair thickening, hair loss and hormones. How does that work for women?

Sophia: It's a funny question actually. There's definitely, in some whatever, the fluctuation during the menstrual cycle as to how the hair feels not as much about how it's shed or not, but what I do ... It's not a huge difference during the cycle except for their hormones will slightly change the amount of secretion. It's sebaceous gland secretion. You do tend to get like oilier hair at one point during the cycle versus another. Just kind of the same way as acne responds to a menstrual cycle, for instance.

Sophia: But I think the greater connection is, again, this dysregulation of hormones. A lot of women are experiencing PMS, a dysregulated menstrual cycle. As you know we've talked a lot about estrogen dominance, for instance, and PCOS. They're on a rise. The reason why they impact hair follicles and impact hair loss is because, for instance, when a woman is ... when an amount of progesterone to estrogen is dysregulated like it happens in estrogen dominance, you have less progesterone because cortisol steals that progesterone makes cortisol.

Sophia: Now, you have more estrogen. Estrogen is known to actually block the transition or too much estrogen is known to block the transition of the follicle from the resting phase to the new growth phase. We know that that happens. As you have that imbalance, of course, you're having a problem with how follicles cycle and grow. In the same way for ... There's an increased amount of inflammation.

Sophia: When you have again stress and dysregulated menstrual cycles as a result of its impact of cortisol on other hormones like estrogen and progesterone, you will have more pro-inflammatory state, and follicles are extremely sensitive to inflammation. There's more inflammatory cytokines that trigger a progression of reactive oxygen species and more inflammation and, of course, you get more hair loss as well.

Dave: Stress during certain parts of the cycle where you're more prone to inflammation, it could trigger enough inflammation to affect the hair?

Sophia: It's not so much that there's a huge shift in the menstrual recycle during the menstrual cycle. Of course, there's a very slight change. Our bodies are really finely tuned. In a way that the menstrual cycle doesn't affect hair growth as much, but a dysregulated menstrual cycle is connected to hair loss because there's other bigger problems at hand.

Sophia: A dysregulated menstrual cycle will point to the fact that you might have an excess of insulin and androgens. Both of those things were ... Insulin will raise inflammation and that will affect hair follicles, and androgens will target the hair follicles by shifting them to what we call miniaturization as making them smaller and smaller and smaller. That's what happens when a dysregulated menstrual cycle occurs such as what happens in women with polycystic ovarian syndrome, for instance.

Sophia: In the same way, it'll happen. If you don't have PCOS, if you just have a dysregulated menstrual cycle, a lot of women are in estrogen dominance. They have PMS. They have other symptoms. That can also cause a big shift in the hair growth cycle and compromization of the hair growth.

Dave: What about birth control pills? Good for your hair bad for your hair?

Sophia: I'm not a big fan.

Dave: Keep going out. Hear more.

Sophia: You were going to say something.

Dave: I was just going to say that's awesome. My very first book was around fertility. It was called The Better Baby Book 1300 references. We looked a lot with birth control pills too. We didn't look at hair though. Tell me why you're not a big fan?

Sophia: For the same reasons. I think it contributes to estrogen dominance and estrogen dominance will impact hair loss. Again, it dysregulates normal hormonal balances as it occur. I have a philosophy, and it also from a point of view of ... There's a physiological

aspect of this. Of course, you're adding more estrogen to already a hyperestrogenic state state because when we're chronically stressed, there is a hyperestrogenic state and also with the addition of xenoestrogens and other estrogens from the environment.

Sophia: You're already compounding that issue. Also, the extra-progesterone that you're ingesting will decrease production of your own progesterone. As a result, progesterone actually stimulates the growth phase, anagen phase. That's why women who are pregnant have this luscious awesome hair because it actually prolongs their anagen phase or growth phase.

Sophia: As a result, you're basically compromising your own hormonal production and your own normal hormonal balance with the OCPs. Then, from a more spiritual, more yogi perspective and I do have a background in that as well, women are lucky in the way that they can actually renew themselves every cycle. There's a downward flow. There's an aspect of clearing some of that stress, the energy, the detoxification all of it sort of renewing yourself every cycle which is why they say men should go into sweat lodge every month.

Sophia: There's that components as well. That compromising that and I hear a lot of women saying, oh, I haven't had my period in six years. Well, great, but you're also storing all this energy. You're not excreting. You're not letting go off. In my mind, there's a sort of double that both of those things that affect you as a woman, so taking an OCP will compromise both of the spiritual and emotional, psychological as well as physiological balance.

Dave: It makes a lot of sense. There's an increased cancer risk from taking birth control pills and things like that. I tell all of my women friends who are on the pill like you're going to pay for that down the road and using effective birth control is really important, but that birth control comes with a larger cost down the road that isn't well known, but is well understood at this point when you look at the data.

Dave: You choose something that's effective, but not something that is going to increase all kinds of risk later in life. I'm happy we got to talk about that. Tell me about what happens inside the hair follicle when hair starts to get then.

Sophia: What happens when we're stressed and actually these are clinical observations have been sort of anecdotal, but now, there's new evidence they came out that talks about a direct brain follicle connection. The pathways have only been recently elucidated. What's really cool and maybe not cool for us for the hair loss, but what we do know is that hair follicles actually have their own functional mechanisms for producing hormones, for producing cortisol.

Sophia: We know that in the whole body, we have the hypothalamus that tells the pituitary gland to secrete ACTH which tells the adrenal glands to secrete cortisol. We know that that's the HPA access, the hypothalamic pituitary access, it is actually exactly replicated in the follicle itself. That's something that is research only recently showed so that when the follicle is stimulated from the outside by cortisol, by corticotropin-releasing

hormones, it actually has its own ability to produce that cortisol itself and can also use this mechanism to adapt to stress which, of course, stacks the cortisol on top of cortisol.

Sophia: What happens is that it actually dysregulates the surrounding immune responses. It produces more inflammation. It stimulates mast cells. They do granulate into release inflammatory molecules that will cause apoptosis cell death and also early induction of catagen which is the regression phase and inhibit hair growth.

Sophia: The other brain follicle connection is that our nerves. We have a really wide awesome meshwork of nerves that surrounds the follicles in the skin. That's why we feel things. That's why the follicle stand up or the hair stands up in our hands or that's why, for instance, eczema or psoriasis get worse when you're stressed out because of that direct connection to the nerves.

Sophia: The nerves will release neuromodulatory substances such as nerve growth factor and substance P which will ... Actually in some cases for women, I believe that that's the reason why they feel dysesthesias during hair loss or during certain types of hair loss. They feel actual tingling or pain in the hair fall around the hair follicles.

Sophia: I believe that that's in relationship to these neurological mechanisms, but basically, the systems, the brain gets hyperactive. It sends down signals. These nerves, they release these factors which also stimulate the mast cell. They granulate, increase more inflammation, but also, at the same time, compromise what is called the follicle immune privilege. The follicles have a unique system because they're conduit between the environments and the internal body system. They have a unique way of protecting themselves from inflammation by having this immune privilege.

Sophia: But as a result of what's been shown is that substance P, for instance, neuro-immunomodulatory and neuro-immune substance, that's released from the nerves can actually compromise that. It can actually compromise that immune privilege which allows the follicles to be exposed to more inflammation or to trigger inflammation in the body. That has been linked to certain types of hair loss in itself like alopecia areata or scarring alopecia but also is obviously a process that can manifest in other types of hair loss.

Dave: Very helpful. Thank you. I've seen people use topical progesterone which is another hormone to influence hair growth as well. There's something that some men do. When you're dealing with your data that you have from Nutrafol, do you test for that? Do you see people use progesterone at all ? Is that correlated with hair loss or hair growth or anything?

Sophia: It's very important for hair growth. Ultimately, it does stimulate the anagen phase that like I said and also has some implications for to use mitochondria energy production. It's important for hair growth. Our philosophy here however is to rebalance from the inside out, again, bringing ... Every organ has the ability to heal itself given the right conditions and circumstances.

Sophia: Having the ability to read that. Going backwards, for instance, putting progesterone on, it's almost like saying, okay, I put minoxidil on. I'll cover up what's happening at the moment, but at the same time not dealing with the underneath problem. The underneath problem, in this case, is actually stress.

Sophia: Stress will compromise hair production. Stress will compromise progesterone production, and stress will compromise the adrenal glands and the digestion, all the things that are absolutely important for the hair follicle to thrive and grow.

Dave: I mean let's face it. If you look in the mirror and your hair is thinning or so it's falling out and your hairbrush is full like, yeah, of course, I'm going to meditate. I'll eat some better food, et cetera, but seriously, I don't want my hair to stop falling out right now.

Dave: Obviously, that's why you guys make Nutrafol because we have a supplement that helps with hair loss that's based on science, but, yes. Ultimately, we all want everything to work well internally. That's certainly I'm in support of that, but if it's going to keep my hair from falling out while I get my inner house of cards in order, should I smear that stuff on my scalp or not. Does it make a difference if you're a man or woman?

Sophia: Personally, I've never tried it, and I don't have experience of it. I know that some physicians use it in their practice, but I think that everything that is used topically only has a success rate of about 50%. It could work for some people. It might not work for others.

Sophia: Ultimately, if you're using it, it has only 50% chance of working. I think with hair, of course, a lot of people try different things, but ultimately, anything topical usually has an effect of about 50%.

Dave: If I flip a coin, am I going to be one of the two people who gets her growth from using progesterone that might be worth it.

Sophia: You could. You could try it. I think you could try it, but again, you're sort of covering up the symptom without really addressing the issue. I think the greatest thing that you can do is really address the issue from the inside out and not to say that you can't add on to it. There's lots of people that do.

Sophia: Hair loss is multifactorial in the same way you can use a multi-modal approach. You can also use PRP plus supplements. You could do other things. I don't know. I don't have first-hand experience. I know that a lot of our physicians do use it for some patients, but it's not as common as I would have expected it to be if it had such a great effect. It would have been used by many more people.

Dave: I would also suggest people maybe get their progesterone levels tested if already high. It's not going to be a good idea. I did buy some over-the-counter cream. I smeared it on my forehead for a couple weeks to see what would happen. What happened was I smelled like lavender really heavily seeing the difference, but maybe I needed to use it for a couple months, and maybe need a higher strength. I didn't get prescription.

Dave: Progesterones are very powerful anti-inflammatory. I did take it orally after I had a substantial traumatic brain injury a couple years ago. I've talked about that on a few other podcasts with JJ Virgin and Mark Gordon and all. It can have a powerful way to just turn off that inflammation, but same thing. Turning off inflammation to keep your hair right now that's okay, but you might want to turn it off permanently at the source instead of blocking it.

Dave: I am curious about topical progesterone. I would say if your labs show that you're not high in progesterone and you want to try smearing it on your scalp, you're going to have greasy hair if you do it, but who knows. Maybe, it's worth it, but you should have the building blocks for healthy hair. You should be controlling your cortisol levels and things like that which is the direction that you take with the Nutrafol supplement which is kind of cool.

Sophia: Exactly. You want to really cut it from the beginning. When cortisol is produced, it steals from progesterone. That's really what happens when you're chronically producing cortisol. The body will respond by stealing from progesterone because they come from the same precursor. That's the root of the issue. Most people who are having low progesterone and who have estrogen dominance as a result of that.

Dave: What about coloring your hair? Is it good for your hair or bad for your hair? At least your hair follicles.

Sophia: It's not good, but I do it. I can't really talk against it. I think that the less you do to your hair, the better it is. If you're going to color it, I'm a big fan of not being really black-and-white about anything.

Dave: Like blue hair color, red hair?

Sophia: Just for Burning Man. But black and white means that you're going to be more stressed out about following certain rules and being sort of allowing yourself to do certain things is fine, so not to be crazy about it, but what I do is I color my hair, but at the same time, I don't do thing else to it. I let it be in its curly form. A lot of people used to blow dry their hair straight and that's the thing that we do. We have salons everywhere. You can get it done every day now. There's this is whole thing about social media and how you have to have a good hair day every day.

Sophia: That's all actually what it's doing is that it's compromising the scalp itself. The more products you put in, the heat from the blow drying, everything is really causing inflammation and free radicals in the scalp. The last you do with that, the better it is. I'm not saying don’t do any of it because you do want your hair to look good. You want to style it in some way. Maybe, you want to color it. Maybe, I want to get blond. It's fine, but it does cause damage.

Sophia: The good news is you can. You can take anti-inflammatories. You can also take really powerful antioxidants that are going to boost your own production of antioxidants and counter that assault. Minimize them is the best way to go.

Dave: Minimize hair dying. How about hairspray, hair gel, things like that or they can increase my risk of thinning or falling out hair?

Sophia: Well, I put that all in the same sort of realm. I put on all of in physical stressors that are affecting your scalp. They do all create inflammation and an oxidative stress. For instance, we know for sure things like SLS will cause a problem in the scalp that causes irritation.

Dave: Sodium lauryl sulfate.

Sophia: Yeah, exactly. Parabens will alter your hormonal balance. Choosing the products wisely. I tried my best to use only natural products. I'm very selective in my shampoo and conditioner and in any styling products that I use. In fact, I don't actually use any just to minimize the amount of additives and toxins and chemicals that are growing into the system.

Dave: There are a bunch of shampoos out there that say they're for thinning hair, preventing baldness, et cetera. Does any of that stuff have merit?

Sophia: The way I look at it is this. Most of that stuff is do no harm. When you're applying something topically, well, of course there's serums and things like that that could work that have phyto-actives that will work, but in terms of shampoos and conditioners, if you think about it's on your scalp for about 10, I don't even know, five minutes, how long it goes on there for, it doesn't have too much effect.

Sophia: I would say, in that case, the best thing you can do is do no harm, to choose the products that have the least amount of chemicals so that you can minimize your exposure to those and minimize the inflammation and oxidative stress that comes as a result.

Dave: There's some pretty good evidence at least in men for Nizoral which is a kind of shampoo that's antifungal. The problem there is all the rest of the ingredients are not ingredients [crosstalk 00:51:01]. I don't want to put those on my skin, but that one content maybe someone listening is going to compound a clean shampoo that has the Nizoral active ingredient.

Sophia: Ketoconazole.

Dave: Yeah. Somebody make me a Ketoconazole shampoo. Send me some. I want it.

Sophia: I would say you can also use tea tree oil. You can go the natural route. Ketoconazole is basically an antifungal. What you're doing is you're decreasing inflammation by getting rid of the extra pathogens which are the fungal elements. That causes dandruff and to dandruff again, it cause inflammation and any inflammation can contribute to hair loss. You could use natural shampoos. Tea tree oil is a great anti-fungal. That's something that you can use instead of the ketoconazole and Nizoral.

Dave: That makes sense. Now, I mean I've talked about thousands of fans. I just did a couple meetups in New York and Chicago. I've seen men and women who go through periods of extreme stress who can get thin hair which we talked about. There's also people and it seems to hit women before men, but if they go into unending ketosis without cycling in or out or they practice intermittent fasting every single day for long periods of time, they also can get thin hair.

Dave: Certainly, I've seen this over and over with people who are our former vegans who got thin hair. In fact, it's one of the first things that can happen after a few months of that perhaps lack of collagen, lack of essential fatty acids, lack of minerals like a protein. All those things can contribute, but I mean what's the role in situations like that of ... Is this mitochondrial? Is it hormonal? Is it nutrient deficiency? Is it all three or those different use cases?

Sophia: I think it's all three actually. You're talking about a little bit of a different thing. Vegans, I think they have the issue of collagen and essential fatty acids and protein. I see that a lot. We ask our customers so you know what their diet is like.

Sophia: I think a lot of vegans, unfortunately, a lot of people go vegetarian or vegan. At times, they just don't have the proper education. They kind of wind up eating the wrong things which are actually pro-inflammatory as well. For instance, if you're going vegan and you're not gluten free and you're suddenly eating a ton of pasta, that's not helpful to the body. That just creates more inflammation and compromises the gut actually more.

Sophia: As a result of that, there's a lot of research now that says that the gut is highly tied to hair. It is actually fascinating stuff. They're saying that they fed some mice probiotic. They resulted in a decrease in inflammatory markers and improved luscious fur. In the same way, feeding a proper diet to ... or even exchanging the microbiome like fecal matter transplant resulted in full hair growth and individuals who had alopecia areata or alopecia universalis which is a complete loss of hair. They had completely regrowth.

Dave: It could be your gut bacteria.

Sophia: I think it could be also your gut bacteria. If they're not getting the proper nutrition the proper balance, you're getting a dysbiosis and especially if you're complimenting with foods that are not good, for instance, the processed sugars even if you're a vegan, you're going to compromise the gut barrier. As a result, increase permeability of the gut, and increase inflammation and bad results in hair loss as well.

Sophia: I think that's the one thing. Then, the ketosis people who are not ... I mean I'm a fan of the ketogenic diet.

Dave: I am. Me too. One of the first books about it, right?

Sophia: I'm a big fan. I can't fully do it myself because my body type is not adjusted to that.

Dave: You have to cycle in and out especially women. Very few women can go full keto all the time without substantial problems with hormones.

Sophia: Exactly. I think that's where you're hitting on the nail on the head here is that you have to be mindful. You have to again being strict about something is great, but nothing works the same for everybody. Listening to your body and knowing what you're feeling and a hair loss could be a great way of, unfortunately, I don't want it to be your way of looking at it, but it is a symptom. It's a symptom of an imbalanced stress response. It's a symptom of an imbalanced immune response. It's a symptom of something happening in the body that's not supposed to be.

Dave: It's kind of interesting just going back to the gut bacteria where you talked about that ... A guy has been on the show several times, Naveen Jane, runs a company called Viome, V-I-O-M-E and with their tests, I've been able to get like full data on everything that's growing in my gut. They also track the amount of human DNA or gut lining shedding that's happening as a result of the bacteria and the other stuff going in your gut.

Dave: I don't have data on this, but I would be surprised if there wasn't a correlation between the amount of gut lining shedding and hair quality. It's a marker of inflammation. I've been tweaking stuff. In fact, I'm about to write a blog post on that about what I've been able to do to control that shedding of the gut lining in order to reduce inflammation in the body by making a tweaks. It's actually resulted in me getting even leaner without any work at all.

Dave: I think that could be an inflammation sign or it could actually be more directly tied, but do you know what species of bacteria are going to give me luscious fur because I'm all down for that?

Sophia: That's a trade secret for now.

Dave: I don't think the science is out yet, but we'll probably find it.

Sophia: There is some science. Yes, there is some science. There's a couple of strains of bacteria. I have to look at my data, to be honest with you. I can't remember off the top of my head, but what I do know is that there's a direct correlation to hair growth and hair health in general.

Sophia: There's multiple studies that showed that stress, for instance, will impact gap junctions or, sorry, tight junctions. It increases permeability. They've shown in studies that are related to eczema, acne, and psoriasis that microparticles, the lipopolysaccharides from bacteria leaked into the blood and actually wind up in the skin and cause inflammation.

Sophia: The hair studies are a little bit behind, but there are a bunch that are coming in now. In the last year or so, there's a couple that came out, animal studies that showed that if you feed a certain type of bacteria to mice, their microbiome changes. As a result of that, the inflammatory markers change. Then, they have healthier hair growth.

Sophia: They've also experimented with, for instance, polycystic ovarian syndrome which is marked by hair loss that showed that simulated models and animal models, they show animals dysregulated with PCOS will actually have more inflammation. Obviously, they have insulin resistance and have androgen production, but when they give them certain bacteria, certain probiotics, their ovaries go back to normal.

Sophia: Then, the androgens go back to normal. Same goes with fecal matter transplants. We know that when we optimize the gut bacteria and optimize the gut lining, that the hormones that are responsible for hair growth, and hair loss will normalize. In the same way, we know that when we do that, we can actually achieve better hair growth. It's very new. This is all very, very brand new.

Sophia: Probably in the last year or so, this research is coming out. I know that in Columbia, they are doing research now on fecal matter transplant and alopecia universalis. They've seen some major ... at least two cases that I've seen reported where two men where they've had fecal matter transplants for Clostridium difficile infection or chronic infections which is the only indication in the United States for fecal matter transplant now.

Sophia: But, coincidentally, they had alopecia universalis such as complete loss of hair everywhere for up to 10 years refractory to treatment. All of a sudden, they get all of this new bacteria, their microbiome normalizes and they start growing hair again.

Dave: Whoa. You mentioned LPS which made me really happy. A lot of people haven't heard of this. It was a big focus of the bulletproof diet and some headstrong too. It's called lipopolysaccharide. When you have bad gut bacteria or stress gut bacteria from what you eat, they make higher levels of LPS which is a mitochondrial depressant. It's a toxin that causes problems throughout the body.

Dave: If you're eating industrially raised meat which I would consider unhealthy and unethical, you'll likely to have bad gut bacteria because you're getting antibiotic residues in your body. The most commonly known substance for blocking LPS is the oldest one out there is activated charcoal. If you're going to be eating crap or you know you have dysbiosis, I think there's a good case for taking some of that. Those studies have been around, I mean, forever, the ayurvedic tradition do this thousands of years ago.

Dave: But even now if you've just Google for what activated charcoal can do and there's a bunch written on the Bulletproof site because I make one, but absorbing LPS if you have it in your gut seems like it's a good idea for you. LPS, is it directly correlated with hair loss?

Sophia: It's indirect. You know for instance because of inflammation, exactly. There have been studies directly saying that they found it in [inaudible 01:01:03] let's say, but there are studies saying no and it showed that it's found in the skin. It activates pathologies like acne which is very similar to hair loss in terms of how it caused in a stress, hormone, inflammation and pathogens.

Sophia: This is just one way, but what I do want to say though is that because we're talking about stress here is that the gut microbiome is not just compromised by poor diet, but it's also compromised by psycho-emotional stress.

Sophia: I think that's a very important point because I was a great example of that, diagnosed with IBS, all of these irregular things. Now, looking back, all I was as an adrenal fatigue and of course I was losing hair, but as a result of this adrenal dysfunction and constant chronic production of cortisol, I completely dysregulated my digestion as well which, of course, contributed to my hair loss. It's important to realize that again going back to the sources of these dysfunctions, it's not diet modifications, but it's also again stress reduction because cortisol will absolutely increase permeability of the ... It actually has direct effect on the colonic cells and their permeability and, as well also, of course, on the vagus nerve which controls the digestion and inflammation as well.

Dave: From your own path, you've sort of dialed in on the stuff that you put into Nutrafol where you're saying you've got to control your stress so you need lifestyle modifications which you incorporated, but you also want the adaptogenic herbs. Then, you want the right nutrients to support the hair growth things like zinc. I'm not sure what else you're putting in there, but that's dialed in based on your chief medical officer. What are the other big bucket items that you put in the stuff that you're taking?

Sophia: Generally speaking, what we want to do is we want to target all of these components. You have the stress component. What we do is we incorporate Ashwagandha. Again, we're using botanical extracts that are almost pharmaceutical grade meaning they're standardized that clinically tested. I think that's very important when you're choosing your ingredients and [inaudible 01:03:18] your supplements.

Sophia: Of course, you speak a lot to that as to where they come from and how they're manufactured and what bioavailability they have in the body. All these have been tested for bioavailability and absorption and also their efficacy in clinical studies. We use ashwagandha as a stress adaptogen, the major stress adaptogen in our product, and it has been clinically shown to lower cortisol levels and clinically stressed adults, also improve thyroid function because, again, thyroid function is impacted by high stress and cortisol as well.

Sophia: That is important for hair growth because it is one of the major signals for production of energy and follicles need energy. Then, we target the inflammation. Inflammation is important to target because it's been found and shown in every type of hair loss something that again Western medicine didn't recognize before, but now, we know the immune system is highly linked or it actually regulates the biological clocks. It needs to be perfectly regulated.

Sophia: As long as you have more inflammatory cytokines, inflammatory molecules produced at the follicle, you need to calm that down. You need high potency anti-inflammatories that can target [inaudible 01:04:31] these cytokines that lead to hair loss. We use curcumin which is an extract of turmeric for that. Again, all of these of course are multi-targeted. They have multiple vital actives are nice because they target so many

receptors. They're able to rebound rather than go in one particular direction which is, for instance, the case with medications.

Sophia: Supplement, there's a natural dihydrotestosterone inhibitor. That's what we used it to counter the DHT, the testosterone androgen ... hyper-endogen production in hair loss unlike propecia or finasteride, it does not have any sexual side effects. It has been shown to increase nitric oxide production. Actually, it improves libido and sexual functioning. I think that's a question that a lot of men will always ask as to whether or not something like this can affect your libido because of the mechanism of action.

Sophia: But it doesn't actually. It's more of a rebalancing action unlike finasteride. We have potent antioxidants like [inaudible 01:05:35] antioxidants. You build up the own ... You can take antioxidants which [inaudible 01:05:45], but you really want something that was your own production of glutathione, catalase and superoxide dismutase which are depleted with age and stress.

Sophia: These systems attack. You really want to stimulate your body again to heal itself and to produce more of these. That's our kind of multi-pronged approach. In addition to that, of course, there's supporting nutrients like zinc, selenium, iodine, from kelp and many other. We have 21 ingredients in total; so collagen as well, all sourced from very clean sources that with smaller fish. We talked about North Korea. We go to Iceland and Norway for our sources of kelp and collagen.

Sophia: A couple of other, vitamin D, all of these things that are really important in terms of supporting the full multi-pronged multi-targeted approach.

Dave: That's pretty cool. The idea of being able to stack things for a specific outcome is something that I definitely support, and an outcome of having luscious fur. I mean, hey, [crosstalk 01:06:51]. Now, Sophie if someone came to you tomorrow and said, "I want to perform better at everything that I do as a human being and I want three pieces of advice," what would you tell the most important things you've discovered in your life for just being better at everything.

Sophia: Being superhuman.

Dave: Not superhuman. Just better at everything like better being a human being. You want to be better at not just wearing a cape or something like that, but we all do things all day long. We want to be better at them. What matters most?

Sophia: I think authenticity, being authentic to yourself and to others. I think it's very important to being authentic with yourself about what you want in life and your passions in life. I think that authenticity with yourself will ultimately translate to others so being yourself is really, really cool. I've had my share of challenges in life going for medical school a kind of residency where I didn't feel like I fully belonged in that environment that was very strict and regulated.

Sophia: When I find myself doing this, I really blossomed into who I am because it's what I like to do. Following that sort of authenticity, I think is going to make you better at everything. It is a hard questions.

Dave: We got one of them. Only two more to go.

Sophia: One of them, huh? I think being empathic, I think being empathic is super important as well. Not all of us are good at it. Some of us are better than others. I think if we're not good at it, then they should recognize that and try to work on it because we still live in a community. It's one thing being somewhere meditating in Tibet and other thing being in the world and being able to communicate and to empathize with others.

Sophia: I think empathy is highly important where you can understand that you're doing something that's not just for yourself, but for the greater good of others. I think that translates well into being a good human and being better at everything. You put me in a spot. What's the third one? I think finding joy in everything that you do. I know that's a hard thing to say. That's almost like cliche is like affirmations or do people would be good, this and that.

Sophia: But, really, it's about tuning into the moment and seeing that you could maybe find a joy in it. I think it'll make your life so much more easier. I'm actually still learning how to do that. I haven't like grasped it all or figured it out or anything like that. That's kind of the things that I want to practice it's my life.

Dave: You're not alone. I think everyone's working on being joyful all the time.

Sophia: I'm not saying being happy all the time. You're going to have moments of sadness. That's okay too. I think our society tells us that we have to be happy all the time or never feel sad like feeling sad is bad. I'm not saying that feeling sad is bad. I think just find the joy in your average tasks or even anything that you might not even feel bad might not want to do. Finding that joy will actually make you feel better about it when doing it and make you better at it and be happier as a result of it.

Dave: I like that advice. I also like they didn't say have good hair because I don't think that's one of the three most important piece of [crosstalk 01:10:22] either, but it's something that all of us would probably like to have. Thanks for not stacking the deck on that one.

Sophia: No. I mean having great hair is a bonus. That's a great thing. I think that ultimately why I feel so good about what we do is because we are helping a lot of people deal with their ... We're doing this through actually rebalancing the inside-out. Then, doing that, you're making people feel healthier. I think hair is important, and it has a huge psychological impact especially on women, but we also have to keep those other things in mind like being authentic, being empathic, being joyful, being happy with yourself as some of the ... looking at the beauty within in a way because you're always looking at the beauty without, yes, hair is important. It's going to shape our face. It's going to make us look better whatever.

Sophia: But then, there's tons of beautiful bald women out there or bald men who don't feel at all ... shouldn't be feeling bad or compromised during different and the ones who do have hair. It's just that it's a great bonus, but it's not the most important thing in life.

Dave: I totally agree. Thank you, by the way. Your website is Nutrafol, N-U-T-R-A-F-O-L. If you go to Nutrafol.com/bulletproof, you're offering $20 off if they want to try the Nutrafol supplement for hair growth and keeping your hair healthy which is an awesome gift for the audience. I appreciate you doing that. I guess that's part of that authenticity thing.

Dave: I would say I'm not done hacking my hair. All the guys in my family been bald by the time they were 25 and 45. I saw most of my hair, but it's been going back a little bit. I've been sort of fighting the good fight and usually winning, but I do notice variations based on what I'm doing and working to get to the bottom of it. Thank your for sharing your knowledge and explain the difference between what's going on in men and women, and it's been a fun interview.

Sophia: Thank you so much, Dave. We're going to have to send you some.

Dave: All right. I'll give it a try. Thank you.

Sophia: All right. bye-bye.