



Episode 429: How Light Can Heal (or Damage) Your Health & Hormones With Andy Mant

Child: Welcome to my Mommy's podcast.

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This episode is brought to you by Wellnesse. We make personal care products that go above and beyond just non-toxic to actually be beneficial for you from the outside in. I realized years ago that even some of my most naturally minded friends and family members who made an effort to eat organic food and be really cognizant of what they brought into their homes were still using certain personal care products, mainly hair care and oral care. And the reason was, they weren't willing to sacrifice how they looked and felt just to use natural products. And none of the natural products they were finding really lived up to the conventional products as far as how effective they were. So, I resolved to change this and realized I had things that I've been making in my kitchen for years that worked just as well and that I could share with other families, and thus Wellnesse was born. You've probably heard that what goes on our body gets into our body and that many of the chemicals we encounter end up in our bloodstream. To me, this means non-toxic and safe should be the absolute bare minimum baseline for any products that are in our lives. But I wanted to take it a step further. I wanted it to use this to our advantage to actually put beneficial ingredients in our hair care, toothpaste, personal care products so that we could benefit our body from the outside in. Why not use that wonderful skin barrier to our advantage?

Our hair care is packed with ingredients like nettle, which helps hair get thicker over time. Our dry shampoo has scalp promoting products that really help follicles stay strong. And our toothpaste, for instance, has a naturally occurring mineral called hydroxyapatite, which is the exact formulation or exact mineral that's on our teeth that's present in strong enamel. So they're all designed to work with the body, not against it to help you have stronger, healthier hair and teeth. We now have a hand sanitizer that doesn't dry out your hands like many hand sanitizers do. I would be honored if you would check it out and I would love to hear your feedback. You can find all of our products at wellnesse.com.

Katie: Hello, and welcome to the Wellness Mama Podcast. I'm Katie from wellnessmama.com and wellnesse.com. That's Wellnesse with an E on the end, my new personal care line. This episode is all about light and how it might be aging you faster than you want it to, affecting your hormones, damaging your sleep,

and so much more, and also how to use it to your advantage to fix all of those things. I'm here with Andy Mant who is the founder and CEO of BLUblox. It's a company specializing in evidence-based advanced light-filtering eyewear.

Andy started BLUblox after becoming dissatisfied with the quality and standards of other blue light blocking products and is a very staunch advocate of light and how to use it for your health. He's extremely well-educated on this topic. We go a lot of different directions on this podcast and he gives so many practical tips for using light to your advantage whether it be for better health and hormones, for anti-aging purposes, to lose weight, for better sleep, and so much more. So much good information. I don't wanna waste any more time talking about it. I'm ready to just jump in. So without further ado, let's join Andy. Andy, welcome to the podcast.

Andy: Hey, Katie, thank you so much for having me on. It's a real honor to be able to speak to you and your beautiful community.

Katie: I'm really excited to go deep on this topic because anyone listening has probably heard me talk about how I've used light in various different ways before. One of my most common pieces of health advice is to go outside as soon as possible after waking up and get natural sunlight. Even on a cloudy day, you're getting so much more light than you're getting inside, and how this creates a whole hormonal cascade that is important for so many reasons throughout the day. And I think we will probably end up touching on some of those today. But I think to start broad and then be able to, kind of, dive in from there. I'd love for you to give us an overview of light, in general, and specifically, maybe some of the differences between natural and artificial light, specifically related to blue light, which seems to be an increasingly hot button topic right now.

Andy: Yeah, absolutely. And, you know, it's a really good starting point to really explain what light is and what this so-called thing called blue light is because a lot of people don't even see blue light. You know, it's all around us. But, you know, sometimes it's not that visible to the naked eye. So, I guess light can be split into two sources that you rightly mentioned. You've got natural light, which comes from campfires, the sunlight, maybe the moon and the stars, and you've also got artificial light, which comes from anything really that's man-made. So, light-emitting diodes, you know, your LED-backlit digital devices like your laptop, your TV, your smartphone, but also your house lights, your fridge lights, little LEDs that are on appliances. They all admit this thing called blue light.

So, when you look at natural light, that's the best starting point because natural light from the sun contains all different colors of light. So, if you think of, on a rainy and sunny day, you see something in the sky called a rainbow and that gives you all the colors that are emitted from sunlight. And you can then see all the different colors that are admitted. You can't really see them all during the day. But when you see this phenomenon of a rainbow, you can see all the different colors that are present. And we've evolved under that big ball of fire in the sky for hundreds of thousands if not millions of years. And we developed something that helped run our circadian rhythms, our body clocks, and our hormones from utilizing that sunlight as basically a gateway messaging system to our brains, and all the different frequencies of light. So you know, your reds, your

orange, your ambers, your yellows, your blues, your greens, they all send different messages to the body at different times of the day.

Natural light is really unique because it changes its frequencies throughout the day. So what frequencies of light you see maybe at sunrise is very different to what you see at midday and very different to what you see at sunset. And the reason for that is it's the messaging system. So those different changing frequencies of light from the sun will send different messages to the body and allow us to optimally secrete or suppress different neurotransmitters in different hormones.

Now, with artificial light, where this differs from natural light is that what we've done is in order to make these energy-efficient digital devices, and LEDs, and fluorescent lighting is that engineers have stripped out a lot of the sort of, economically friendly frequencies of light, the ones that are gonna unpop your electricity bill if used and replaced it with the ones in there that's basically gonna keep your bills low, not use as much energy and keep, I guess, you know, the costs down but also, you know, help the environment because they're not guzzling tons of electricity, which is great, but at the expense that our eyes and our body, when they detect the frequencies of light that are present in the LEDs, which is really just blue light and a very, very small amount of the other colors, it gives the wrong and mixed messages to this body clock that we've developed from living outside.

So, what happens is our hormones can become a little bit skewiff. They can become a little bit unbalanced and we can disrupt our sleep. And we can get things called digital eyestrain, headaches during the day because it's isolated and, you know, it's not any restorative red present. So, it really isn't good for our health albeit it's probably better for the environment and better for our wallets. So, what we've done is we've evolved this amazing circadian rhythm, which is a body clock, and I can come and talk about that a little bit more later, by living outside, like, you know, sort of, caveperson ancestors that would have lived outside. We've still got that same ancient circadian rhythm today. But our environment that we live in is very, very different to back then. And the light signals we're receiving from artificial sources are not the same as sunlight, which is disrupting our hormones, damaging our sleep, and actually causing a lot of discomfort for the human population at the moment.

Katie: Wow. That makes so much sense. And I love that you mentioned LED and I wanna go a lot of other directions as well. But before we move on from that, there seems to be a lot of conflicting information about what is the best type of light to have in indoor environments because certainly, most people aren't willing to go back to candles and lanterns. So, assuming that we're going to have light in our homes, is there an optimal one to choose? I'm guessing not LEDs, but any guidelines from there?

Andy: Yes. So the main issue you've got with indoor lighting is twofold, okay? The first factor that comes into play is light-related. So, if you go to, you know, the hardware store, or Amazon, or wherever you may buy your light bulbs from, you'll buy an LED light bulb. You'll put it into, you know, your wall light or your lamp or whatever it may be, and it will admit very high frequencies of blue light, which is basically saying to our brain that it's solar noon 24/7. So we can't move out of that phase and the hormones that are present during that

time of the day, namely cortisol, which is a stress hormone, will just chronically be elevated over the period of, you know, as long as you're awake and under that type of light.

The second issue you've got that would need to be addressed is something called flicker. So, Dr. Alexander Winch talks a lot about this. And he's one of the leading experts in light in Germany and has been studying it for around about 20, 25 years. And the flicker is something that's present in LED lights because they run off something called an alternating current. Now, it's typically invisible to see. So you can't actually detect this, but your brain can detect it. And the reason that these light bulbs flicker is, again, it's an energy-saving technique because old incandescent bulbs back, you know, sort of, pre-1990 all run off a direct current, which basically kept a constant stream of electricity going through the light bulb, which kept this, sort of, constant beam of light. But with trying to save money and save the environment, they decided to run off an alternating current, which pulses out electricity into your light bulb very rapidly, which doesn't mean that, you know, it's using the same amount of energy that the DC electric current incandescent bulbs use.

But what this does to our brains is that it actually makes our brains work harder to be able to piece together the images through the eyes. And this is why when you work on the LED lights, you'll typically get a headache, dry eyes, watery eyes. It's the high flicker rate of LED bulbs. But what you can do is that there are light bulbs out there that convert the AC to DC electric current and also remove the spike in blue light found in those bulbs. So the best ones on the market, there's two...I always like to give people a choice. There's actually ones that we make called Lumi, which eradicate flicker and reduce the spike of blue light quite considerably and add in some of the more beneficial colors. And also there's a bulb called Sunlite, L-I-T-E is the spelling of lite, which does the same thing and it's from a competitive company. So those are two to look at if you wanna change your indoor lighting to make it more friendly.

The other factor with LEDs is if you don't wanna change to circadian friendly light bulbs, Lumi or Sunlite, you can actually look more at balancing the light in your home or work environment because it goes back to what I was saying a little bit earlier about the sun. You know, the sun has very high frequencies of blue but it also has high frequencies of red and amber light. So a lot of the people that come to us, we say, "Look, there's some other things you can do here to actually help your light management and light environment rather than just wearing blue light glasses, which is very important to do, you should wear them in the evening, you should wear them in the day, and we can talk about that a little bit more later, but you also need to look at balancing the lights as well." So I like to have a lot of red lights around my LED devices. And yes, I might have, on my laptop, you know, like Iris or f.lux software on there. But if I'm watching TV, I need a lot of candles on. I need some salt lamps on. I might even have...you know, in the winter, will light the fire. And this then balances out a lot of the blue light that's coming out from these LED sources.

Another thing you need to look at, Katie, which I believe a lot of your audience may not have heard of before is that light angle plays a very, very key role as well. So when we evolved ancestrally, the light that we received during the day came from above and the light that we received from post-sunset in the evenings came from the ground up. And there's been some evidence in preliminary studies that have actually alluded to the fact that the angle of light during the day and the evening can actually impact your circadian rhythms as well. So, by that, I mean that if you're gonna set up your light environment during the day, you ideally want to have

light coming from overhead if you can. And if you are putting lights on in the evening, ideally, they would be red or orange because you don't wanna disrupt your skin or your central clock system, you would have those lights coming from a lamp, which is coming from the ground up rather than ceiling lights as well so you don't then disrupt your clock system from beam angle of light as well.

Katie: That's such a good tip and that's what we're doing in our home as well is the lights we have in our ceiling, kind of, fixtures are the brighter daylight type bulbs. And then the ones that we have...we have the no blue light red light bulbs in lamps throughout our house. And so, we try, we're not always perfect about it, but try it around sunset to switch those, and to have not just the switch and the light bulb, but I haven't heard anybody else really explaining this like you have, having that change in direction, which makes complete sense when you think about that, historically, we would have hung out around campfires, or candles, or lanterns, or much smaller sources of light that were on eye level versus the sun being so bright in the sky. And I definitely wanna go deep a little bit now on blue light, and especially how we can manipulate it at night, especially. I think there's been more and more conversation about how blue light can be harmful, especially from artificial sources, which is great but I do worry that I think it's also made people afraid of all blue light without realizing that there was blue light, correct me if I'm wrong, but that naturally happens during bright daylight outside. So it's not that blue light in and of itself is bad. It's that the time and the place and how we're getting it. Is that right?

Andy: Yeah, that's absolutely correct. And, you know, I imagine quite a few listeners might have heard me speak on other shows and I always apply context to everything. There's never...You know, I don't ever wanna get down to this point of being this, sort of, zealot in light and hater of blue light or, you know, suffer any, kind of, cognitive dissonance when it comes to competing evidence about blue light. And, you know, that's a really good point because blue light isn't all bad. Okay? And the context applies to the fact that, again, it comes back to how you receive that light. And blue light during the day is fantastic. It keeps our serotonin levels regulated, our dopamine levels regulated, and our cortisol levels regulated. And the reason it does that is because the sunlight admits a lot of blue light and it changes, you know, very subtly throughout the day to then regulate those neurotransmitters and hormones. But what the sun also has in there is that it also has different frequencies of light that play different roles in the regulation and suppression of other neurotransmitters and hormones, which then balance out the effects of blue light, both positive and negative.

And one of the things that blue light actually does, regardless of what source you receive it in, it's a very high energy, tightly bundled package of light. Okay? So what that means is that, yes, it provides all these fantastic benefits from the sun, from artificial sources as well, but what it does is it damages us at a cellular level because there's so much energy in it, we will have cellular damage in the eyes and the skin from blue light. And this is why people always say and studies have shown that people that are exposed to copious amounts of blue light in isolation, that's the context applied, and I'll explain more shortly, they will suffer accelerated aging because cells are turned over a lot quicker. But what the sun has in it, nature always has an antidote.

And the antidote, in this case, is red light around about the 660-nanometer range and near-infrared around about the 850-nanometer range. And what these do is that they repair any of the damage the blue light is causing from the sun during the day. So there's this mutual benefit. You're getting all the benefits from blue,

but any other damage that happens, the red light and the invisible infrared lights steps in to repair that damage. And this is why we've seen the onset and the accessibility of red light therapy devices come out and all those red light therapy devices that are out there, whether it's, you know, Joovv, whether it's BLUbox Hive, whether it's any of the other brands that are out there, they all harness the specific frequencies that then repair the damage caused by blue light from artificial sources or during the sun. So 660 nanometers red, 850 invisible near-infrared light.

So, what happens is that the reason blue light gets a bad name during the day is because there's no red light present in all these screens and LED lights. So we get all the benefits of blue light that the sun would give us. We get all the damage at a cellular level, that the blue light from the sun would give us at an artificial level. But what we're not then doing is being outside, getting the healing properties of red and infrared light to restore that damage. And also, if you can't get outside or it's winter months, utilizing a red light therapy device. And it's really interesting when you look at light as a whole as well...I did warn Katie of this, guys that are listening, and girls, that I do go off on tangents. And I think this is probably a good moment to do it is that there was a really interesting study about a year ago that came out which showed...it basically wanted to look at the damage of ultraviolet light during the day. So we get a lot of...Ultraviolet light gets a lot of bad press, but we need UV light from the sun during the day to synthesize with cholesterol to make vitamin D, higher vitamin D levels, lower all-cause mortality, no brainer.

But what the media and science look at is that UV light causes cellular damage much like blue light does. And what they did was they took some skin cells from people and they wanted to see if they could recover any of the cellular damage caused by ultraviolet light during the day under laboratory conditions. And what they found was when they shone blue light in isolation on the skin cells, they remained active and none of the repair mechanisms or repair enzymes that came out didn't have the chance to come out and do what they needed to do. When they took the light away from the skin cells and actually put the skin cells in complete darkness, they started to behave differently, and they started to release enzymes, and chemicals, and properties, which allowed healing to take place at cellular level, the autophagy and apoptosis could step in, which led the article to not conclude but to ask more questions that more studies need to be done in so much that UV light, yes, is gonna cause cellular damage much like blue light does.

But when we go outside and we're sunbathing during the day or we're outside and we get a little bit pink from the sun, we've probably had too much UV exposure, our cells are a little bit damaged. What do we then go and do? We go home, we turn on all our lights in our house and our skin then can't repair that UV damage, which in the long-term could cause aging, and maybe even worse, you know, like skin cancers and things like that. So, you know, it goes to show that, you know, the sun isn't inherently bad. Yes, it will cause some damage from blue light at a cellular level, from UV light at a cellular level, but what we're then doing is we're bathing then in blue light when we should be in darkness or around red light and not allowing our skin and eyes and circadian rhythms to heal from that cellular damage that's happened during the day.

Katie: That's an important point. And so, just to clarify about that, it's probably ideal, but it's not that they have to happen at the exact same time. But it's that that balance is completely off because I've noticed just anecdotally, when I spend time in front of my red light, which is that 660 and that 800 or 850, whatever you

mentioned, if I spend enough time there in the morning and at night, even if I'm in the sun a lot during the day, I'm much less likely to burn or to have any kind of what seems like damage from the sun. Can it be within a certain window or any guidelines there?

Andy: Yeah, really good question. Typically what I like to do, and I will caveat this, that this is anecdotal, there's no evidence to suggest what I'm about to say, but I always like to look at things ancestrally. So, when would our ancestors have received red light in its visible form? And the answer is any time of the day. You know, it would be emitted from the sun and it would be emitted from campfires. Now, when would our ancestors have seen, or not seen but been exposed to invisible infrared light? Well, really only between the hours of sunset to sunrise because that's when it's emitted from the sun. So, for me, when I utilize red light therapy, I will typically use the red light during the day to balance out a lot of the ill effects of blue light in office environments and other areas. But if I want to use the infrared, I will only use that during daylight hours and probably more towards when it's more visible in terms of being present in sunlight, which is at sunrise and sunset.

And, you know, this is why it's always very important to be outside at sunrise because, you know, you mentioned just then that, you know, when you go outside and, you know, you're out in the UV at the higher parts of the day, you won't burn when you've had that infrared treatment. And that goes hand in hand with, you know, watching the sunrise because when the sun rises, the frequencies of light are very high, are orange and reds, but also infrared. So, when you expose yourself to those frequencies of light in the morning, you are actually going to start producing something in your skin called melanin. And melanin is a pigment and it's a potent absorber of infiltration pigment of ultraviolet light. So, when you look at, you know, different populations around the world and where they live, they have different pigments to their skin. So someone that lives in Iceland would have very, very pale skin. Someone that lives on Equatorial Africa would have very, very dark skin, and that's because of melanin.

And what it does is, because at the Equator there's huge amounts of UV light present all the time pretty much when the sun's out, the populations there need to have a lot more of this melanin because otherwise, they're just gonna OD on UV light and, you know, skin cancer rates would be absolutely through the roof because they'd just be, you know, bombarded by this UV light. So, you know, those populations have evolved and their skin has evolved to harbor this melanin, which keeps them safe from UV light. Now, when you go up to Iceland, Northern Canada, Scandinavia, those types of places, it's very, very minimal amounts of UV light and not even all year round. So, they don't need hardly any melanin in their skin because they don't need to filter out UV. They need to get a load of it into their bodies very quickly to get all that, you know, really good vitamin D to keep them healthy.

And the good thing is, is wherever you go in the world, so I'm obviously from the United Kingdom, from England, but I'm living in Western Australia. Now, England gets no sunshine, and I was very pale all through the year there. But when I've come to Australia, I quickly adopted, you know, good circadian practice, which is watching the sunrise. I was outside for a good half an hour every morning. And now, I have a really, sort of, dark skin complexion. And even through the winter, I maintain it from being outside. And it's really been, you know, probably eight years since I've actually had any sunburn because I've built up that melanin. That's the

good news. You know, wherever you are in the world, you can build up that melanin. The major issues we have are the fact that, you know, the general population will wake up, miss the sunrise, look at their phone, go outside when UV is present, not exposing themselves to IR light, and then have no protection. They might put sunscreen on which, you know, is negligible, whether that does anything in terms of sun protection and all the chemicals that are involved in it.

But if, you know, the population decided, you know what? I'm going to watch the sunrise and, you know, build up my melanin and be able then to go outside when the UV light is present, you know, they wouldn't sunburn as much as someone that hasn't done that. And, you know, we still have to remain sun safe. You know, like, you know, look at other animals, you know, they don't bask in the sun all day, unless they're lizards. You know, mammals will seek the shade. So, it's not a case of have half an hour on the Joovv in the morning and you can go out for 8 hours in 105-degree searing Utah desert heat. It's just not gonna happen. You will burn and it will be an issue. You know, you've gotta seek the shade. And, you know, that's why it's important to be outside when UV light isn't present, which typically is between sunrise and about 11:00 a.m. And then between the hours of 11:00 and 3:00 p.m. or 11:00 a.m. to 3:00 p.m. is typically when UV is at its highest, which should be, you know, you can be outside but you still wanna be seeking the shade as well to provide that protection.

Katie: I'm glad you brought that up because I think there's definitely been a movement of conventional advice saying, "Stay out of the sun entirely, especially midday sun." And I think you bring up a great point that it really is much more about balance and being cautious. And like you said, we're not meant to spend all of our time outside in the sun. Our body's actually pretty good at telling us when we need to get out of the sun. And I've had that same experience now living in a much sunnier climate. My heritage is very Irish. And I, growing up, burned all the time. And now through I think better diet, much better light hygiene, and much more balanced time in the sun regularly, I almost never burn and end up getting, like, quite tan during the summer from those same things that you mentioned.

It brings up another question. I have only heard this anecdotally, and so, I'm hoping you can confirm or deny. But I often see people, of course, here where I live, it's very sunny, wearing sunglasses nonstop. And I've heard at least anecdotally from people that wearing sunglasses can actually interfere with some of the important hormonal signaling mechanisms that happen when we're in the sun, and actually, potentially might make you more likely to burn. Do you know if there's any validity to that and if so, why?

Andy: Yeah, absolutely. There is a study on this, and I can send that to you, that has looked at this. But we've got to remember that, you know, whenever you've got a belief, there's typically a study for everything. So, more work does need to be done on this subject. And the PhDs that did it actually conclude that as well that they had some great evidence, but more work needed to be done on it. And I'll talk a little bit through about what the study looked at. So the study looked at, basically, the susceptibility of an individual, or a group of individuals in this case, to sunburn wearing polarized sunglasses as opposed to wearing no sunglasses. And what they found was that there was a higher rate of incidences of sunburn of people in the group that wore the sunglasses as opposed to the group that wore no sunglasses. And it went on to explain some of the mechanisms behind that.

So, I'll try and explain in layman terms why that happened because there is evidence out there that suggests mechanisms as to why that would happen. And it all comes down to, again, circadian rhythms but why certain frequencies of light signal certain mechanisms within the body to protect against UV light and then potential sunburn. And it all comes down to how the body detects ultraviolet light. So, if you went outside right now, I mean, that's probably a bad example, it's evening time here, but it's morning here in Australia, so if I went outside right now, and looked around me, I could not tell you if UV light was present. And the reason being is we can't see it. It's invisible. Now, as we mentioned earlier, UV light is good, but it also causes damage. So, the body needs to be able to figure out a way through evolution to detect when ultraviolet light is present.

And in the scientific communities, it's been proven that when blue light is present, the body knows that ultraviolet light is present. And the reason being is because ancestrally, our circadian rhythm evolved under the sun. And whenever the sky is blue, typically there's no clouds, typically the sun is shining, and typically UV light would always be present from that sun source. So when there's blue light present, that sends a signal to the brain that UV light is also present in its environment. And, you know, you can even go down more rabbit holes by going well, you know, we look at blue light in the evening, so that's really not good.

Now, the biggest antagonist for ultraviolet light is cortisol. And what blue light signal does when it signals to our circadian rhythm is it elevates our cortisol levels. And it does it for two reasons. According to studies, the first one is to obviously give us that, sort of, jump start in the morning to be able to be active and alert. Without cortisol, we would be very lethargic. But it also is released because it's that antagonist to UV light because blue light's present and that signals the brain release cortisol because UV is present and we need an antagonist to stop any excess UV damage that may occur if we're out all day in that ultraviolet light and environment.

So where I'm going with this is, if you're wearing polarized sunglasses, you're filtering a lot of the blue light that's actually meant to be passing through your eyes and signaling to the brain to pump your cortisol levels up further to be able to then protect against any of the UV light that's coming in. So, when you're wearing sunglasses, you're not getting the true frequencies of light that are coming from the sun to provide the hormonal trigger in cortisol to actually protect yourself against UV light. So when you're wearing sunglasses, you're blocking some of those important frequencies, creating your own junk light environment by wearing those glasses, which is sending incorrect or weaker signals to the circadian clock system, which is probably keeping your cortisol levels lower than they should be, which is leaving you more susceptible to UV damage. So I hope that, kind of, explains it in very basic terms.

Katie: Yeah, that was a great explanation. I was taking notes over here. And that is a perfect segue into just how intricately...you've already explained it a little bit from the cortisol perspective, but just how intricately light is really tied into our hormones. And I feel like I'm always trying to get this across, especially to women, especially, I hear from so many women who have different types of hormonal issues or thyroid issues. And I get the tendency that we don't necessarily immediately feel the impact of light on those things. But I've seen in my own life so much how using light to your advantage can have such a drastic impact on your hormones.

And I've even seen this measured in lab results, not just with my cortisol, but also with my thyroid hormones and my sleep metrics. So, walk us through some of the other ways that light really does have that drastic, drastic impact on our hormones, especially maybe thyroid as well.

Andy: Absolutely, yeah, really good question because a lot of people just think blue light, bad sleep, blue light, digital eye strain, depending on the time of day. So, yeah, light regulates our hormonal system. And it regulates pretty much 90%, I would say probably off the cuff, of our hormones. The others are all circadianly linked, but they're also linked by other, you know, external factors such as cold temperature, exercise, meal timing, things like that. So from a...you know, we can go into hundreds of hormones. We'll pick the main ones. We'll start with the thyroid, which is the main, sort of, source of hormone generation. You know, and we've seen huge amounts of increase. When we look at, sort of, graphs for the last 20 years, we can see huge increases in hypothyroidism and Hashimoto's. And scarily enough, mainly in the women population as well, which is interesting.

And, you know, I always hate the, you know, correlation must mean causation. It's not at all, you know. You have to look at other things. And, you know, 20 years ago when this started to peak was typically when the advent of LEDs and digital backlit devices started to come in. But, you know, there's obviously other factors at play. And, you know, I'm not one of these, again, people that say that, you know, you sort your light environment out, you are gonna be 100%. It's one of five pillars of health behind, you know, exercise, nutrition, mental well-being, sort of, wellness, and management of electromagnetic frequencies. So, you know, it's one pillar to address and, you know, we mentioned earlier, a little bit about cortisol. Cortisol gets a bad rap because so many people have such elevated cortisol levels or a reversed cortisol cycle. But when we have a proper circadian rhythm, cortisol, it plays a very key role in keeping us healthy.

But, you know, blue light does two things to cortisol. Firstly, it elevates it unnaturally. And we need to have blue light elevated, sorry, cortisol elevated free blue light during the day to keep us alert and active and protect us from UV. But when we're putting on the TV or not wearing blue light blocking glasses after sunset and, you know, potentially exposing ourselves to house lights that are high in blue light, that's keeping our cortisol levels continually elevated. And something called melatonin can't be produced optimally when cortisol is present. The cycles have to be the complete opposite to one another to be optimal. Cortisol goes down, melatonin goes up, melatonin helps us sleep and helps us repair. Cortisol goes up, melatonin goes down. And typically that cycle happens, you know, cortisol goes up in the morning and drops all the way down until the evening and melatonin does the opposite.

But what we've seen in studies is that people either have chronically elevated cortisol levels, which leads to stress, anxiety, depression, but it can also reverse it as well. So what that means is that you find it hard to get up in the morning, you feel sluggish because your melatonin levels are higher than your cortisol in the morning. And then as the day goes on, you feel more and more alert to the point where, you know, you get home in the evening and it's 9:00, 10:00 at night and you're like, you know, lit up like you've had 14 coffees during the day when you probably haven't because your cortisol levels are starting to spike when they should be reducing. You can't then get to sleep. You get really bad quality sleep. Your insulin hormone then gets completely messed up, which makes you crave sugary, fatty, starchy foods more than normal, which then

leads to weight gain and other hormonal imbalances because you're not sleeping because your cortisol cycles mismatched.

And with the thyroid, the thyroid is so susceptible to blue light. There was a really good study in Japan about eight years ago, which showed this that, you know, they were testing the thyroid and how blue light might impact the production of hormones. And the interesting thing about the thyroid is, yes, it's a regulator of hormones, but it's so close to the surface of the skin. It's, you know, a few millimeters below the surface of the skin, which means that blue light can get there very, very quickly, cause cellular damage, which can actually impact the function of hormones and the production through the thyroid. And its location is both a bit of a double-edged sword. It's bad because blue light is going to interfere with hormone production, but also on the good side because it's so close to the surface of the skin and red light therapy could actually balance that out.

So, what I typically suggest for people that are concerned about this is when you're utilizing a computer or using your smartphone, and these are the two biggest predicted causes of issues with blue light and the thyroid because you're so close to a screen, it's basically when you're on your phone, where is it, it's pointing at your thyroid, is you can basically put apps on your laptop or on your phone to stop the blue light. But you can also wear, like, a silk scarf around the thyroid, and that will help protect against a blue light. But also utilizing red light therapy, again, is a great thing. So, you know, just 10, 20 minutes red light 660 nanometers on your thyroid is gonna really help, sort of, restore the balance any cellular damage that might have been caused by blue light during the day will really help that.

Some other hormones, interestingly enough, actually comes down to, sort of, more than the reproductive health side of things. And a lot of blue light exposure, again, has been shown in a couple of studies. And I know Jack Cruz has talked about it quite a lot, who's one of that, sort of, leading experts in light, as well as Winch, is that light can actually impact the regulation of the cycles of estrogen and testosterone. And, you know, the exposure of blue light in isolation constantly without allowing, you know, the skin to be able to repair itself can elevate risks of breast cancers and things like that because estrogen levels can get a little bit out of control. And melatonin also plays a huge role in the reproductive systems as well in both men and women but particularly women.

Melatonin is a really interesting hormone that can only be produced in the absence of blue and green lights after sunset. And people think of it as a sleep hormone, but it's a really, really powerful antioxidant. And it's unlike any other antioxidant, okay, and it's very different because every antioxidant... Say you go and have a bowl of blueberries now and, you know, acai berries and those types of things really good and high in antioxidants. Those antioxidants will neutralize a lot of the reactive oxygen species and free radicals that are floating around causing cellular damage. But during that chemical reaction, they release more reactive oxygen species. So yes, you might get rid of two, but you're gonna produce one in response to it. Melatonin is the only antioxidant that reacts with reactive oxygen species and doesn't produce byproducts that are reactive oxygen species.

So it's the most potent antioxidant ever, only produced in the absence of blue and green light. So, after sunset, before you go to bed and whilst you're sleeping. And it's found in very, very high regions in the placenta and ovaries of women because there's a lot of high turnover of cells in those areas. And the melatonin is there to protect against that high turnover rate and stop anything developing that could be nasty from a health perspective later on in life. And when you look at the unfortunateness of polycystic ovary syndrome, for instance, women that typically suffer from that have very low melatonin levels. And, you know, that may coincide with the fact that, well, you need the melatonin there because you need to be neutralizing all the reactive oxygen species that are causing, you know, potential cellular dysfunction in those sites.

So, you know, you can also go further into...Probably I'll do one more. Insulin is very interesting as well. And the time of day you eat your meal is very much tied to the light that's present during that day. And when you look at both insulin, leptin, which is a hormone that makes you feel full-up, and ghrelin, which is the hunger hormone, they are all optimal in the morning. And they taper off in their cycle in a correct light cycle by the evening. So, in order to maximize the macronutrient partition of any meal you eat, you should really have the majority of your calories at the beginning of the day and slowly decrease them until sunrise and really not eat much after sunset. But, you know, that's very difficult given the cultural aspect of sharing a meal after work and school with family. It's very hard to do.

But what I'm trying to say that that is the type of light you eat your food under will govern how you utilize those macronutrients that are at a micro-level. And then over time, it could lead to things like weight gain. It could be, you know, other health issues. So, for instance, if you had, I don't know, a bowl of pasta at 8:00 in the evening under artificial blue light, you probably more likely to store those macronutrients as body fat because your body isn't primed digestively, from a circadian rhythm standpoint, to digest that food correctly because you're going into a repair mode, as opposed to if you woke up in the morning, sat outside and watched the sunrise eating that same bowl of pasta, you'd probably be more likely to utilize that as energy. So, it really comes down to, you know, so many different factors and so many different hormones, and you can go into them all if there was, you know, sort of, a 25-part series, but I think those are probably the main ones I think that people would be the most interested in that.

Katie: Yeah, I could definitely see 25 more directions easily. In fact, I've made notes. I think we'll have to do a round two to be able to cover some more questions.

This episode is brought to you by Beekeeper's Naturals. They're on a mission to reinvent your medicine cabinet with clean, effective products that really work. Every year we decide to be more healthy this time of year. And to do that, we need to start by supporting our immune systems, especially right now. That's why they've created a whole hive of products packed with immune loving essentials, so you can feel your best every day. One of my favorites is their Propolis Throat Spray, which is an easy daily spray for just general immune support and is also very soothing for sore scratchy throats. Propolis delivers natural germ-fighting properties and antioxidants to defend and protect our bodies. Theirs is sustainably sourced and it's made with just three simple ingredients. You'll never find refined sugars, dyes, or dirty chemicals in their products ever. When you're ready to upgrade your immune system and your medicine cabinet, check out Beekeeper's

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This episode is brought to you by Wellnesse. We make personal care products that go above and beyond just non-toxic to actually be beneficial for you from the outside in. I realized years ago that even some of my most naturally minded friends and family members who made an effort to eat organic food and be really cognizant of what they brought into their homes were still using certain personal care products, mainly hair care and oral care. And the reason was, they weren't willing to sacrifice how they looked and felt just to use natural products. And none of the natural products they were finding really lived up to the conventional products as far as how effective they were. So, I resolved to change this and realized I had things that I've been making in my kitchen for years that worked just as well and that I could share with other families, and thus Wellnesse was born. You've probably heard that what goes on our body gets into our body and that many of the chemicals we encounter end up in our bloodstream. To me, this means non-toxic and safe should be the absolute bare minimum baseline for any products that are in our lives. But I wanted to take it a step further. I wanted it to use this to our advantage to actually put beneficial ingredients in our hair care, toothpaste, personal care products so that we could benefit our body from the outside in. Why not use that wonderful skin barrier to our advantage?

Our hair care is packed with ingredients like nettle, which helps hair get thicker over time. Our dry shampoo has scalp promoting products that really help follicles stay strong. And our toothpaste, for instance, has a naturally occurring mineral called hydroxyapatite, which is the exact formulation or exact mineral that's on our teeth that's present in strong enamel. So they're all designed to work with the body, not against it to help you have stronger, healthier hair and teeth. We now have a hand sanitizer that doesn't dry out your hands like many hand sanitizers do. I would be honored if you would check it out and I would love to hear your feedback. You can find all of our products at [wellnesse.com](https://www.wellnesse.com).

But you touched briefly on a couple of things that also affect hormones. And I'd love to know if there's an optimal way to maybe stack these things or time them in relation to light to get the biggest advantage. For instance, things like temperature, meal timing, exercise. Are there any good guidelines for how to line those up to our advantage?

Andy: Yeah, absolutely. So it really depends on what your goals are when it comes to exercise. I start with that once that's easy. We are primed from a circadian standpoint to get the best results from cardiovascular exercise within a couple of hours of waking. So if you wanna go running, walking, jogging, swimming, whatever your cardiovascular exercise may be, the morning is the best time to do that. If you're looking to add muscle mass, then, from all the studies that we've looked at, the average best time to do that, from a hormonal standpoint is between the hours of 2:00 and 6:00 p.m. in the afternoon/evening. And typically, we've seen in studies that testosterone is typically highest between those hours and growth hormone. So, typically, if you wanna lift weights, you want to do it between those times. You don't wanna be lifting weight after sunset in a nasty blue-lit gym, for instance, because you'll then have a knock-on effect to damage your sleep, which will mess up your hormones further.

In terms of eating, I guess we've covered that in so much that, you know, your largest...It's an old adage. And I'm sure it's in the U.S. as well and I, sort of, remember it from my childhood in England that, you know, eat breakfast like a king, lunch like a prince, and dinner like a pauper. And that's an easy one to remember because you know that old wives' tale and old adage really rings true to optimal circadian rhythms. You know, you probably want to eat higher carbohydrate-rich foods, if you want to do that, everyone has different dietary preferences, as your first meal and taper them off during the day. That's a huge help.

And in terms of temperature, temperature is an interesting one because it does send cues to various points within the body, but it's more a measure of, you know, handling inflammation. So, you know, if you're feeling very inflamed, you've had a lot of blue light exposure, sometimes cold therapy is really good, you know, see people getting into ice baths these days to boost immunity and things like that. But, you know, the cold is much, like...you know, the cue from the cold is basically telling our body that, you know, it's wintertime, there's not much UV light present. And, you know, when there's not much UV light present, we have to look at it, again, from an ancestral standpoint because when UV light typically isn't present at specific latitudes, you know, equatorial is not gonna be an issue but, you know, some of these more northern latitudes in North America, Europe, and, sort of, Northern Asia will have these effects is that you need to replace UV light with a high DHA-rich fuel source in order to provide the same benefits that UV light would have provided you in the summer months, which is the vitamin D production.

And typically you'll get that from eating more fish. And if you look at Canada, Inuit regions in Alaska, Scandinavia, Japan, Korea, places like that, you know, what are their diets high in abundance of? And it's seafood. And there's no excuse or coincidence with that. And that's in place because during the winter months of cold is signaling that while we've got no UV now for the next six months, we need to get our vitamin D elsewhere. And, you know, animals are pretty much hibernating. It's gonna be tough to find them. Plants are probably gonna be dead because of all the frost. You've probably got some grain from a harvest if you're, sort of, a later, sort of, post-palaeolithic type ancestor, but, you know, what's readily in abundance, you know, let's crack a bit of the ice in the lake and go fishing for some seafood. So, that's typically the role temperature plays.

But in terms, I guess, of setting up your day, again, it really depends what time of the year you're in. You know, a lot of people misread a lot of what's in the mainstream media in so much they say you need eight hours sleep. You know, that's about as useful as saying every female needs 2,000 calories a day and every male needs 2,500. You know, it's all very individualized. And when it comes to sleep, it's seasonal. You know, when UV light is very high and in abundance outside in the summer months, you know, that provides a real mix of direct current, DC electric current within our bodies. And it does this by mixing with DHA in the eyes and creating that current. And that current then allows, you know, our mitochondria, which are our cell batteries, to be really fully powered.

So we don't need as much sleep in those months because we're getting a lot of the ATP from more ultraviolet light production. Food is in abundance so, you know, more energy can be produced more readily. But, you

know, you might get by with six hours sleep. But in the winter, when UV light is a lot lower, we're actually gonna need more sleep. It's darker for a reason. Our bodies need to be able to recover from all that abundance in the summer. There's not as much UV presence, so we need more time to go into apoptosis and autophagy, which is to repair the cells in our body. And we do that by getting more sleep. So we might work better with 10 hours asleep in the winter months. So it's all very...sleep is very different.

But in terms of a general day setup, as well, Katie, I think the biggest thing people can do really is watching that sunrise. It doesn't matter if it's cloudy, it doesn't matter if it's raining, just being outside for a few minutes to, you know, an hour in the morning whenever you can do with your schedule is really gonna set that circadian clock ticking correctly. It's gonna allow you to build some melanin for the UV times in the day if it's summer, or help you build it up ready for the summer months because I know you guys are getting into, sort of, late winter now and early spring. So, you know, regular sun breaks. If you're working indoors all day, you gotta be outside as much as you can. You know, people go out for cigarette breaks in the office so why can't you have a 5-minute sun break at 10:00 a.m. and 3:00 p.m. and eat your lunch outside when you can? Getting light through windows isn't gonna be enough because it's filtering some of those frequencies. You need to be fully out in that natural light where you can, rain or shine.

And, you know, some sunsets are also very important. I think people should really watch those as well. And there's a really interesting phenomena that I've tested on my spectrometer that shows that blue light is highest 20 minutes before the sun sets, which is very interesting. And it's that spike in blue light and then subsequent rapid falling to nothing in the next, sort of, 20, 30 minutes that really signals to the brain that, wow, I can drop cortisol levels now. Blue light's going, the UV light's all gonna be disappeared soon. I don't need cortisol to protect against that. And then melatonin can start being produced. So, you know, these are all amazing free things people can do to really help their circadian rhythms. And it really doesn't take much time. I mean, you add all those up together, you've got a lunch hour, two sun breaks, sunrise and sunset. You're probably looking at, you know, an hour-and-a-half of your day, an hour of which is you're entitled lunchtime anyway. So, I think those are really a good starting point for setting yourself up for a win when it comes to circadian health.

Katie: I love it. And you answered one of my next questions, which was, kind of, the idea of an 80/20 of the best things we can do for light hygiene and for implementing these strategies. I feel like you've already touched on pretty much all of them. And I've been making notes for the show notes, which will be at wellnessmama.fm. But anything else that people can implement? I love that so many of these are free and they involve getting outside, which is the thing people are probably tired of hearing me say on here because I say it so often, but it really is that profound and important. Anything else you'd add on the 80/20 of how to manage light?

Andy: Yeah, absolutely. I think that's one of the things I mentioned earlier about balancing the blue light. So get some salt lamps into your office environment is always really good. You probably wanna be trying to sit somewhere where there's a lot more natural light rather than artificial light. So if you can get a seat that's relatively close to a window, not too close, but relatively close, that's also really helpful. There's also some other hacks to do as well. Like, when you're sleeping, blue light that maybe is creeping in from the neighbor's

house or street lights or car headlights or, you know, your partner getting up to use the bathroom in the night, even if you've got your eyes closed, it's gonna turn down your melatonin production. So a good sleep mask is always worth looking at, 100% blackout as well if you can do that. Yeah, I guess circadian-friendly light bulbs are always great as well. You know, as I mentioned earlier, I think those are always worth having in because blue light does impact the skin as well. It's been shown in a very important study, late 2017, that it can have an issue with circadian health.

And, you know, I think that other people that are looking to optimize their fitness regime as well should look at circadian rhythms. And, you know, maybe if you're doing your cardio after work, try and get up earlier in the morning and do it when the sunrise rises, you're killing two birds with one stone then. You know, you're outside with the sunrise, you're doing your cardio exercise, maybe a jog down the street or cycle or something, or swim. And I think then that's opening you up for a huge win as well. So, I'd probably say, yeah, those things as well would be really beneficial to helping people really align their circadian clocks.

Katie: I love it. And I still have so many questions for you related to kids and pregnancy and light, so I think we're just gonna have to do a round two since it's actually nighttime here and I'm gonna be going to bed and following all of this advice pretty soon. A question I'd love to ask somewhat unrelated at the end is if there's a book or a number of books that have had a profound impact on your life, and if so, what they are and why?

Andy: Yeah, I've been asked this question a few times, actually. And I'm typically not a huge reader of books. And the reason being is I find that when the books are published, you know, 80% of the time, typically, that the information is a little bit outdated in them. So I'm typically a reader of studies. So, I have a free subscription, and anyone can do this with PubMed. And you can set alerts to keywords that are in studies. So, if you're interested in circadian rhythms and exercise, you can sign up and get all the studies just straight to your inbox to have a read of them. And I typically like the app Medium as well because I can sign up to all the latest, sort of, science articles and blogs on there, which gives me real-time information to be able to then form, you know, pretty educated conclusions on specific subjects that I'm interested in.

And to be fair, a lot of books that I do read are more related to, sort of, self-development and, you know, really, sort of, more business-related, which is, sort of, a little bit of a tangent from what we've spoken about today. But I think, you know, one of the books that really resonated with me was Tim Ferriss's "4-Hour Workweek." I just found that I could really, you know, change my mindset in terms of how I absorbed a lot of information, and I didn't need to be, you know, reading for, you know, 15 hours a day. There was hacks to be able to find this information quicker. And the book led me to really increase my productivity, which increased my knowledge and, you know, enjoyment in actually learning more about this specific subject of, you know, photobiology.

Katie: I love it. Well, Andy, you've been a joy to talk to. This was such an informative interview. I have taken probably more show notes from this than I have for any other episode. And like I've said, we're gonna have to do a round two if you're willing. But I'm so grateful for your time. Thank you for being here and for sharing.

Andy: Thank you so much. And yeah, always up for a round two. And yeah, thank you so much for your time, and thank you every everyone that's managed to listen to me waffle on until the end. I really appreciate your time as well.

Katie: As Andy said, thanks to all of you guys for listening, for sharing your most valuable resources, your time and energy, with us today. We're so grateful that you did, and I hope that you will join me again on the next episode of the "Wellness Mama" podcast.

If you're enjoying these interviews, would you please take two minutes to leave a rating or review on iTunes for me? Doing this helps more people to find the podcast, which means even more moms and families could benefit from the information. I really appreciate your time, and thanks as always for listening.