Red Light Therapy for Optimum Health

Guest: Ari Whitten

Niki Gratrix Hi Ari.

Ari Whitten Thanks so much for having me, Niki.

Niki Gratrix It's great to speak to you Ari, you are one of my favorite people. The research that you do is absolutely awesome, you know, I'm a huge fan. I was a super looking forward to this interview because it's on such an interesting topic. You've got a new book coming out, *The Ultimate Guide to Red Light Therapy* is coming out in July.

Ari Whitten Yeah that's right.

Niki Gratrix Okay, it is fantastic. You introduced me to this whole topic, I wasn't aware of it before. I followed all your advice, I've got what you recommend, we'll talk more about that later, it's been awesome. So we're going to talk about red light therapy, what it is, how it can help people, how it works, and a little bit on what people need to do to get the right thing, although they're probably need to buy your book for that. So tell us what is red light therapy?

Ari Whitten Yeah. So. Well, first of all, there's an interesting comment that you made, which is that you're someone who is yourself a health expert who's been in this field for 20 years or something, how long?

Niki Gratrix 15 years. Yeah.

Ari Whitten Yeah 15 years that you've been an expert working with top physicians and on the frontlines studying the research, and you hadn't even heard of this and that is so fascinating. But that is the case for basically everyone, the whole community of people, even in the holistic health community. Vast majority of them have not heard of this technology. And yet what's really interesting about that is you'd think that that then means like, oh, this must be some new idea that is some wacky stuff that doesn't have any science to support it.

It's not a new idea, it's been around for 30 years and there's actually over 3,000 studies, peer reviewed studies showing that this works for all kinds of different benefits, and we're going to talk about what those are. But the science is, and there's a huge body of literature on this, and the studies are actually remarkable, they show huge benefits to so many different things. I mean, it almost seems like a panacea. And yet, like I said, we have this mountain of research and yet hardly anybody's heard of it. So why is that?

I think is an interesting place to start and one of the reasons, couple of reasons. One is that this technology used to be in form of something called cold laser and it goes by a

few different names, but you used to have to use basically laser devices. And these laser devices where oftentimes 10,000 dollars, 20,000 dollars, 30,000 dollars and so they were not accessible to the general public. Most regular people aren't ready to go spend 10 or 20 grand on a device to use in their home, it's just out of the question for most people. And then they were also being used in anti-aging clinics and health spa's and things like that, but you had to pay 100 or 150 bucks per session to use these lights. So this technology's been around like I said, for about 30 years. But because of that, because people thought, oh, I can only get this in a physical therapy clinic or a chiropractors office, or an anti-aging spa or something like that, and it's going to cost a huge amount of money per session. It really made it so most people were not that interested in it.

And then even among physicians, a lot of physicians have not, have been slow to adopt it because, one, the mechanisms of action have been a little bit in question. People don't know exactly how it works in the body or people haven't known, we have a lot more clarity on that now. And people, I think a lot of physicians have been slow to adopt something that they are confused how it even works and it just seems kind of weird. Like shine red light on the body and you get healing and all these benefits, it seems kind of like a wacky idea. To most people, I think it seems almost like new agey non-sense.

And then the other reason is more of a practical reason, which is just that the insurance reimbursements have have been fairly low for physicians on that type of therapy versus many other types of therapy. So they use the ones that are more profitable to them. So for all these reasons, this awareness of this technology has been very slow to develop in both the medical community as well as the general public. But there have been some breakthroughs in just the last few years that now have made this accessible to everyone, and the science has developed to a point where we have a lot more clarity on what it's doing and how it works. So the awareness is growing rapidly and it's really blowing up in popularity.

But the basic idea of what this is, is you shine red light on your body. Now, that's like, pretty simple in essence. Now, I should also point out that there's also something called near infrared light and near infrared light is invisible to the human eye, it's just next to red light on the electromagnetic spectrum. And red and near infrared light are essentially synonymous in terms of the mechanisms of action, what they're actually doing to our body. So everything that I say in this interview applies to both red and near infrared light, they're basically identical. The only real difference, there are a few differences, but the main one is just for people to understand right now is, red is visible red light, near infrared is invisible to the human eye. You can see it with an infrared camera, the human eye is not built to see that part of the electromagnetic spectrum.

Now, one other aspect I should clarify, since I've mentioned the electromagnetic spectrum is, what is the electromagnetic spectrum? Well, it's like from one end of the spectrum, we have things like gamma rays and x-rays with very, very small wavelengths. And then we get into U.V. light and visible light and we've all heard ROY-G-BIV. We learned the colors of the Rainbow ROY-G-BIV which it actually going from this side of the spectrum that I'm working from now, it would be backward. So it would be, we'd start with V, then I, so violet, indigo, blue, green, yellow, orange, red. I mean, literally, those are the colors of light. So if you take a prism and you pass sunlight through it, you'll see the light be split into all of those colors. ROY-G-BIV red, orange, yellow, green, indigo, violet or blue, indigo, violet.

So we have all of that spectrum of the visible light spectrum and then it gets into near infrared, which I've already mentioned, and then far infrared, which we feel as heat that's also invisible. And then it gets into much bigger wavelengths of like radio waves and things like that. So all of this exists on something called the electromagnetic spectrum, visible light and near infrared light and far infrared light or a very small piece of that or overall thing. But like I said, there are thousands of studies now showing that they have absolutely profound and very powerful health benefits on human cells.

Niki Gratrix This is fascinating. And also, I was just thinking about what you were saying about why it hasn't been more popular and why people don't realize. Most physicians don't get training in that, what you just talked about, the electromagnetic spectrum, they don't get training in physics. I think we're obsessed with biochemical, like popping a pill for health. Or thinking that all our energy just comes from proteins, fats and carbs in the diet. So, what you're doing is, which is why I also love your energy blueprint course as well, because you really brought forward just the whole concept of light. That we are electromagnetic beings and that we run off the sun. That's it, is that right? Am I on track?

Ari Whitten Yes. Yeah, absolutely. And actually this really is a profoundly different way of thinking and different paradigm of health compared to the way most people think about it. In the sense that light is something that most people just think of as like, oh, light is like I turn on the light switch in a room and light allows me to see things. And then if there's no light, it's dark and I can't see things like light and darkness, light is just the absence of darkness. But most people have no clue that light actually is influencing the function of their cells and specific kinds of light have different kinds of impact.

There are actually five different types of bioactive light, bioactive meaning active on human cells, they affect the way your cells function. One that people will now make the connection with is U.V. light. But everybody knows, you get sunlight and the U.V. light from the sun hits your skin and allows your body to synthesize vitamin D, which is a critical aspect of health. It's a substance that, a hormone that not a vitamin actually, it's a hormone that regulates over 2,000 genes. So just that alone is telling you that light is a pretty important aspect of health. And these are not just unimportant, irrelevant genes this is regulating hugely important genes that are playing a major role in our health, in our energy levels, in our longevity, and resistance to disease.

In addition to that, we also have another one that people will be somewhat familiar with is blue light. And blue light, for example, when we look up at the sky and we see a blue sky, that is visible blue light entering our eyeballs. Well, blue light, specifically the wavelengths of blue light feedback through our eyes, through the optic nerve back into our brain. And they actually send signals to the circadian clock in our brain that regulates our circadian rhythm, our sleep wake cycle. Which in turn affects dozens of different neurotransmitters and hormones and all kinds of aspects of our physiology, from our energy levels to our appetite, to our caloric expenditure, to our wakefulness, to our sleepiness, and far beyond that. I mean, it's affecting a huge number of aspects of our hormones and our health. So U.V. light and blue light just through those two mechanisms are already having a huge impact on our health.

Then we have far infrared, which again, we feel as heat. And we have things like far infrared saunas or when we go out in the sun and we feel the sun heating up our body. A big part of that is the far infrared energy getting, penetrating through our skin and actually heating us up from the inside. This is important, it affects blood vessel function

and circulation and also detoxification, especially if it's making you sweat. This is a powerful way that we detoxify, it's why far infrared saunas can be so beneficial. And there's a huge body of literature just on the effects of far infrared energy on our health as well and far infrared saunas certainly have lots of benefits. So that's three of the five bioactive kinds of light. And then there's red and near infrared, which we can basically lump together in the same category, even other two different types of light, they have the same effects. The only difference, again, is near infrared is invisible to the human eye and the other difference is it penetrates a little bit deeper in our body than visible red light does.

So what those do is they actually, there's a few different mechanisms we can talk about here and the way I look at it is, it's kind of a funny topic. Because if you go look at a textbook and there are certain textbooks written on this, especially by a Harvard professor named Michael Hamblin, who's a very prominent researcher in the field. But there are literally three dozen different biochemical and pathways that are affected by red and near infrared light exposure. So I can tell you about this particular molecule and that particular molecule, and you can look at it from that perspective.

But I like to kind of simplify things and reduce the effects down or the mechanisms down to two main pathways. One is, the effects directly on mitochondrial energy production. So red and near infrared light actually penetrate through our skin and get down into our bodies. They can actually penetrate over about 2 inches into our bodies. So it's not just like U.V. light where it's hitting the skin and then all the energy is absorbed in the skin. They're actually getting down into our bodies and they can affect things. They can affect bone function, they can even penetrate through the bone of your skull and affect brain function directly, muscle function, tendons, fat, basically all of the tissues that they can reach within two inches. And they also have some systemic effects which we can get into by affecting compounds in the blood as well. So it can, by virtue of that, can affect the whole body.

But the mechanism here, the first one is how it affects mitochondria directly. So that light is actually getting into your cells and then acting directly on the mitochondria, which are the energy producing units of the cell. They are in biology classes, in high school and college, they teach you that they're the powerhouses of the cell, but they're the cellular engine. This is what's producing the energy that your cells run on and the mechanisms have actually been elucidated for the most part.

Basically, what is going on is that the red and near infrared light hits the mitochondrial membrane and it hits a particular part of what's called the respiratory chain, or the electron transport chain on the mitochondria. Which is the part that is responsible for allowing the mitochondria to produce energy, it passes electrons down this thing and then ultimately at the end of it pumps out ATP, adenosine triphosphate. Which is what our cells run on, that that is cellular energy.

So there's a part of the respiratory complex, the electron transport chain in mitochondria called cytochrome c oxidase. And cytochrome c oxidase is a photo acceptor, it is something that actually accepts the energy from light photons and then uses that energy to help create electrons and pass those electrons down. Which ultimately allows the mitochondria to produce energy more efficiently.

Now, cytochrome c oxidase needs to bind to oxygen in order to do that well. One of the problems is in certain kinds of stress states or disease states, nitric oxide, which is NO instead of just O2 builds up in a cell and in the mitochondria in a way that it binds to cytochrome c oxidase and blocks oxygen from getting in and binding to cytochrome c oxidase. And by blocking it, it decreases mitochondrial energy production.

What red light and near infrared light do is that they basically cause what's called photo dissociation of the nitric oxide. So they basically boot that nitric oxide out and allow oxygen to come in and bind to the mitochondria to cytochrome c oxidase and get the mitochondria pumping out energy more efficiently. And this has been studied in numerous experiments now in both in vitro and in vivo.

And we know very definitively at this point that, the primary mechanism of red and near infrared light appears to be that it enhances mitochondrial energy production. So that itself is why this, when you look at the research and you see all these things about red infrared and near infrared light, enhance thyroid health, and enhance brain health, and enhance muscle performance, and enhance mood, and cognitive function, and enhance tendon healing, and diabetic ulcers, and... You see all these things that are on seemingly different parts of the body and different systems. And you're like, how can one therapy do all of this and have so many benefits on different parts of the body, it almost seems like too good to be true, it seems like a panacea and like snake oil.

But the answer is simple, it's because all of those tissues, whether they're skin cells, or brain cells, or heart cells, or whatever. They all ultimately rely on ATP energy produced by the mitochondria. So if you can facilitate that process and help the cells produce more energy, whatever it is they do, whether it's liver cells that are detoxifying or heart cells, or muscle cells that are doing reps of weight lifting, whatever it is, they will work better if they have more energy available to them. So that's the fundamental mechanism, and forgive me if I'm rambling on too long. Feel free to interrupt.

Niki Gratrix I was letting you go because that's brilliant, a superb explanation. And it's still amazing to me, it's still awesome to me to consider, the core of our energy production absolutely, fundamentally requires light. I mean, it's a whole paradigm shift, isn't it? It's amazing and awesome. And it's great that you are doing this work and getting this message out there to a much wider audience. Red lights is presumably part of sunlight, can we get exposure to red light by getting sunlight?

Ari Whitten Yes, absolutely. So in a way, this is something I actually wrote in the book. We have all these red and fancy near infrared light devices. The truth is probably that if we all lived in the lifestyles that humans are meant to live and we lived like our hunter-gatherer ancestors, where we're outdoors for hours, and hours, and hours every day, getting lots of sun on our bodies. We probably wouldn't need red and near infrared light devices. We'd probably be getting most of the benefits, at least the systemic benefits that you get from red and your infrared light irradiating bloodstream through your blood vessels. We'd certainly be getting those and probably a lot of the other benefits. Which would make a lot of this discussion obsolete, honestly.

And so for anybody listening, hey, if you're a hunter-gatherer and you spend hours a day outdoors in the sun or you don't necessarily need to be a hunter-gatherer, but let's say you're construction worker. You probably maybe don't even need to be listening to this. But if you're not, if you're the typical person who spends most of your day indoors or

you live in a place that's not very sunny. Then you almost certainly stand to benefit tremendously through red and near infrared light therapy.

I also give kind of a hypothetical thought experiment, I wish I could say this was a real experiment, but it hasn't been studied. But I basically said, hey, if you were to apply red and near infrared light device to a hunter-gatherer versus a typical westerner living an indoor life. You'd probably see that the effect size of the benefits are way, way less on the hunter-gatherer than they are on the average westerner. Because again, that person's already probably mostly sufficient in red and near infrared light.

And I also want to point out my use of words here. I see red and near infrared light as a necessary nutrient for human health. In much the same way that eating your greens and getting your various B vitamins and, various minerals and things like that. In the same way that those are necessary nutrients, we need all of these bioactive frequencies of light U.V., blue, far infrared, red and near infrared. We need all of them for our physiology to operate properly. And in the same way that if you are magnesium deficient or deficient in folate or whatever, your body starts to not operate properly and certain processes start to not function well. The same exact thing happens when you don't get enough of these bioactive frequencies of light, you get all sorts of problems. Like I said, just U.V. light and vitamin D alone regulates 2,000 genes.

Red and near infrared light are affecting the energy production in your mitochondria in almost every cell in your body. So these are very big deals and I want to also drive this point home by saying that. If we look at light and our intake of light nutrients in the same way that we look at food, most people's light diet is the equivalent of eating an all McDonald's and Twinkie style. I mean, it's that bad, it is horrific in terms of most people's light exposure habits on a daily basis is literally the equivalent of Twinkies and McDonalds all day for every meal.

Niki Gratrix Is phenomenal, isn't it? A massive vitamin L deficiency?

Ari Whitten Yes, exactly.

Niki Gratrix Yeah, it's such a paradigm shift. We're so obsessed with diet and it really is just one small part of this overall picture. It's so interesting light and it's good to know it really backs up the fact that we're humans, we don't live in a vacuum and it's so natural that of course, we need sunlight for health, nature's backing that up. It's the same with the - I mentioned pulsed electromagnetic frequencies. We need the earth frequencies as well, when we don't get those, we need the earth, we need the sun, we need good water.

Actually, I was just going to ask you one other thing as well about mechanisms. Maybe a little bit more fringe, but red and infrared light in terms of the impact on the water in our body. Is that another mechanism?

Ari Whitten Yeah. I'm glad you brought it back to this because I wanted to talk a little bit more about mechanisms. So there's one other, I would say well-defined mechanism. And then there are two that I put in the category of still somewhat unproven, but potential mechanisms that are really fascinating. So the other proven mechanism is hormesis. And hormesis is something that I talk about a lot, it's one of my big passions.

To summarize it very quickly, hormesis is basically the concept of a temporary transient metabolic stress that stimulates our body to undergo adaptations that ultimately confer health benefits. So this seems very counterintuitive, like we're subjecting our body to something that's stressful, which most of us associate that word stress with bad things. But we're subjecting it to something that's stressful in order to get health benefits. So it seems like kind of a wacky abstract idea, but actually pretty much everybody listening to this is already familiar with this concept more than they realize – because exercise, physical exercise works on that principle of hormesis. It is actually a temporary metabolic stressor that causes damage and inflammation and stresses out our cells like crazy, and causes a buildup of lots of free radicals. But when applied in the right dose, systematically, it becomes something that creates adaptations in our cells, stimulates our cells to adapt, to make adaptations that ultimately make them way more resilient to stressors.

And that is why we have a mountain of thousands of scientific studies showing that exercise is associated with prevention of all sorts of diseases, not just muscular diseases, but of brain diseases, of heart diseases, of lung diseases, of anxiety and depression, and like dozens of different diseases. And it's fundamentally because it's a stressor, not because it's intrinsically beneficial, but because it's a stressor that stimulates these adaptations that ultimately confer resilience and resistance to disease.

So it's not just exercise that does this, there are a number of other things that that stimulate these hormetic pathways. Fasting is another one, heat is another one, cold is another one, certain kinds of phytochemicals will also do it as well. We also have what's called hypoxia, like breath holding exercises or going to altitude and things like that will create these effects, and certain kinds of light will do it.

So U.V. light has some hormetic effects, though it's more localized in the skin because it doesn't penetrate deeply and red and near infrared light, also have hormetic effects on our cells. They transiently stress our cells and actually create free radicals and create some inflammation, transiently in a very low dose in a way that stimulates our cells to adapt and become more resilient and resistant to stress. And it does this through a number of different mechanisms.

One is down regulating an inflammatory pathway called NF Kappa-B. And then in tandem with that, we also have the activation of a pathway called NRF-2, which basically helps build up something called the AREB anti-oxidant response element in our cells. And this is basically our internal antioxidant and anti-inflammatory defense system. And basically when we build that up, that is the fundamental thing that makes our cells and our mitochondria much stronger and more resilient and resistant to all kinds of stressors. Not just the stressor of red and near infrared light, but also stressors like toxins, psychological stress and so on. This is literally how you build resilience at the cellular level.

And then there's two really fascinating potential mechanisms. One is the one that you were getting at, which is around Gerald Pollack's work. And there is also some other researchers in this field that have been really interested in looking at what's going on with the water in our cells. And for a long time, for decades, maybe you could say centuries, scientists have just looked at cells as like a bag of water. And the water is there to just fill the cell, it doesn't really do anything and it's just a medium for the chemicals and things like that to float around and the different organelles of the cells to do their

work. It's just the sort of liquid background that is inanimate, not doing anything. Well, there's been a lot of research in the last several years around, maybe that cells aren't just a bag of water, but that water is actually doing important things inside of the cells. And Gerald Pollack's work has shown, basically, that light can affect water and literally the chemical structure of water. In a way that creates a buildup of negative charges around any area where water is next to what's called a hydrophilic surface.

So hydrophilic and hydrophobic, it has to do with the chemical nature of the compound, it's basically water loving or water fearing, you could say. But if you mix oil and water, we know that oil floats on water, that's because it's a hydrophobic substance, it doesn't just mix with the water. Well, our cells, for the most part tend to be hydrophilic in terms of their membranes. So basically what they're getting at is that there seems to be a buildup of negative charges of this, what he's calling exclusion zone water or easy water around the membranes in our cells. And this buildup of this kind of charge separation of negative charges near the membranes, positive charges away from it, basically acts like a battery, it creates a potential for energy and potential for work to be done.

So there's a lot of speculator research around this right now, and then there's some interesting research that's somewhat confirming that. So there's also some, there's one study not done by Gerald Pollack, but done by another group where they looked at, basically the motor on mitochondria that actually pumps out ATP, it's called the mitochondrial ATP synthase pump. And what they found is that, that rotor, I mean, it's literally a physical rotary little machine in our mitochondrial membranes. It actually spins easier with less resistance depending on the water viscosity around it. So, what they did is that they looked at the water viscosity and how it's changed by red and near infrared light exposure. And showed that red and near infrared light exposure literally makes the water more slippery, thinner so that the ATP synthase pump on the mitochondria can spin easier and pump out energy more efficiently.

So basically, in addition to that cytochrome c oxidase pathway in the mitochondria that I mentioned earlier. There is also this intriguing possibility that red and near infrared light may be acting throughout the cell in all the water in the cell to create this charge separation. And create this kind of, affect the water viscosity and effect may be other aspects of function in the cell by virtue of building up this easy water inside of the cell.

Niki Gratrix So you just said more slippery and thinner, so the water is most slippery and thinner. That's really again I think it's amazing. When we get exposed to saunas, sunlight, it's making the water in our blood more slippery and thinner, so our circulation's better, everything's flowing better in the capillaries.

I think it was Gilbert Ling actually showed, maybe you'll correct me on this. All the mitochondria and the heart wouldn't have been strong enough to pump the blood around anyway, all the way to the ends of the capillaries. But when you have easy water, basically that is creating the movement of flow at the peripheral levels. I don't know if you came across that research?

Ari Whitten Yes. You're mixing up a couple of people, but the gist of what you're saying is correct. So I actually forget the guy who said that, and I actually quote this in the Energy Blueprint program, but I haven't looked at in a long time. But it's something to the effect of what you said, that if you were to unravel all of the capillaries in your body, there's just no way that the force of the heart, and we can actually measure the force of

the heart. There is no way that the force of the heart is able to pump blood through all of those tubes just through the mechanical action of the heart alone.

And basically what they're getting at is that there is an assist action through this easy water, that's basically facilitating flow of water through the capillaries. And this has been demonstrated in studies where they've put little tubes submerged in water that are hydrophilic substances much like our capillaries are. And then basically just shine light on it and showed that water will start naturally flowing through the tube under its own accord, just by applying light energy to that.

Niki Gratrix So that is amazing, there you have it in black and white.

Ari Whitten Yeah. So there's one other thing that you're getting at with Gilbert Ling, this is a little bit more geeky and detailed. But part of what's going on in the membranes of our cells is that membranes have to maintain iron gradients, certain concentrations of minerals, sodium, potassium, calcium, things like that inside versus outside the cells.

And sometimes there are very high concentrations of minerals inside or outside the cell and across that membrane. They have to maintain those gradients for the cell to function properly, for the blood, to have the right concentration or the extracellular fluid, to have the right concentration of minerals. They all need the right concentration of minerals and ions to function well. So that's across a membrane, now naturally, just if there were no other things going on, if you just had like a high concentration of, let's say, potassium and low sodium on one side and then the opposite, high sodium on one side and low potassium on the other side of the membrane. If you just let that system do its thing on its own, you're gonna get passive diffusion and an equalizing of these gradients. So what we know is that there are pumps for ions inside of our cell membranes, and even pumps for ions in the organelles inside of our cells.

So the mitochondria needs a certain gradient of ions and the Golgi apparatus needs, and the ribosomes needs, and the nucleus needs. So they all have their own little membranes and they all need to maintain the proper ion gradients. So we have all these trillions of cells and each cell has, I don't know the actual number, hundreds or thousands, probably thousands of little iron pumps that are active at any moment doing work to pump certain ions out, pump certain ions in, across these membranes to maintain these gradients all of the time, even when we're at rest.

And we know that certain of these pumps, certain of them have been studied very, very well, like the sodium, potassium, ATPA's pump in particular has been studied very well. And the thing is, these pumps in order for them to do work, they require energy, they require ATP. Which again, is produced by primarily by the mitochondria, almost entirely by the mitochondria.

So Gilbert Ling did some interesting calculations where he basically said, he calculated, here's how many pumps are at the membrane and in order to maintain these ion gradients they're using up, he actually did the math and said, here's how much ATP they would actually require to maintain these ion gradients. And then that's not even including all the pumps on all the different organelles inside of each cell, but just the pumps at the cell membrane alone. Basically, once he did the math, figured out that they would require way more ATP than the cell is actually generating, if the iron gradients were just maintained through the action of these ATP requiring ion pumps.

So basically what I'm getting at is that this layer of charged water, exclusion zone water. The reason it's called exclusion zone is that it excludes and it excludes things like ions, so that the cell can actually maintain these ion gradients properly without requiring huge amounts of ATP for all these different pumps to do all of this work. Just the water itself is doing some of the work of maintaining these iron gradients, but that's what Gilbert Ling was getting at. That's just another layer of how the water inside the cells may be really, really important to our health. And just to connect one last dot. Light again, especially red and near infrared light causes that exclusion zone to grow. So the energy from light is making bigger exclusion zones of water in our cells and creating more of that potential energy and more of that sort of battery in the cell.

Niki Gratrix Hence things like sunlight, sauna, doing red light, and I want to talk about that next. How do people, what are the devices out there? And ultimately people should read your book for that, but maybe you can cover that a little bit.

Ari Whitten Yes.

Niki Gratrix I'd just also like to mention that's also why vegetable juicing is full of structured water and it's full of light. So its's how to increase your light quota is drinking vegetable juices.

Ari Whitten Well, there's one other fascinating layer to that. And real quick, funny story. But when I was in high school, my biology teacher was this, we thought she was like the craziest old lady in the world and we used to just make fun of her relentlessly. Because she was like this hippie, health conscious girl who back in, this was in the early 90s, who was doing vegetable juicing. And then she would juice vegetables and she would drink green juices. Which for high school kids we thought was totally disgusting and then she'd go out in the sun and she'd sunbathe. And she was convinced that she was doing some like photosynthesis type of thing, she was able to drink the chlorophyll and that she could photosynthesize like plants. And we just thought it was the most hilarious thing in the world that, here's our crazy biology teacher thinks she's a plant and thinks she can photosynthesize.

So here's the really interesting thing related to what you're just talking about. You were talking about it from one angle, which is that plants may have this easy water that we can drink and kind of absorb that easy water directly. Maybe the case still needs to be studied, but it's an interesting line of thinking that I know Gerald Pollack himself is very intrigued by.

But there is another, one more potential mechanism of red and near infrared light that's fascinating. Which is, a couple of years ago, it was shown that mammalian cells, humans are mammals, by the way. So we have mammalian cells, but other mammals do as well, can use chlorophyll metabolites, certain breakdown products of when we consume chlorophyll in the diet. Our metabolism breaks down and we produce certain metabolites of that chlorophyll that then get incorporated into our cells. Then those chlorophyll metabolites actually do have the power to interact with red and near infrared light specifically, because that's the kind of light that actually penetrates deepest in our body in order to facilitate energy production by our mitochondria. So chlorophyl byproducts or chlorophyll metabolites can actually interact with light, including sunlight,

but red and near infrared light in a way that actually helps our cells produce more energy.

Niki Gratrix So that's a little bit of photosynthesis.

Ari Whitten Exactly. Yeah, it's quite interesting when you think about that because it's almost analogous. It's not the exact same chemical process as photosynthesis, but human cells are using light to produce energy inside of the cell. Which is again, a whole new paradigm of health.

In biology, these different classifications of organisms, you have heterotropes and an autotropes. Autotropes mean they produce their own energy, so like plants that photosynthesize, produce their own energy. Heterotropes need to eat other things, eat plants or eat animals in order to acquire energy. And it's always been thought that humans are heterotropes and we get all of our energy by eating stuff. But it turns out that we're actually probably more in this other third classification of what are called mixotropes or photo-heterotropes. Where we do certainly acquire lots of our energy, if not most of our energy from things we eat. But our cells do seem to be able to get some energy from light, which is kind of an amazing thing and really a revolution in most people's thinking.

Niki Gratrix Yeah. Your crazy biology teacher wasn't so crazy.

Ari Whitten Exactly. That's the moral of the story, is that we were the idiots and she was the smart one.

Niki Gratrix So that is brilliant, it's so interesting. So let's just talk on this last question I have for you. In terms of the devices out there, because it's a minefield, right? There's like LED's now versus lasers, and there's a lot of stuff that doesn't work properly out there and now you've done tons of research.

Ari Whitten Yeah.

Niki Gratrix So do you want to just give an overview as best you can of what's out there? And ultimately, we should just get people to get your book to know what to get.

Ari Whitten Absolutely. But I'm happy to give information here. In the book, I give a lot of details around all the science, around all the different benefits that have been proven for red and near infrared light. So brain optimization, the research showing it can prevent or treat neurological diseases or depression or anxiety, enhance cognitive function. And I'll just kind of list off some of these.

Another big area of benefit is skin anti-aging and cellulite reduction. That's why it's so common in anti-aging clinics is it really has profound effects in enhancing collagen production in the skin, and the research on this is actually amazing how profound of an effect it has on skin anti-aging. Also, one of the few things that is actually proven to actually truly work to decrease cellulite. Most things on the market that make claims around that don't actually work. Fat loss, hair regrowth, wound healing, tendon healing, enhancing muscle performance, strength, endurance, adaptations to exercise.

So doing it in tandem with exercise, this is actually an area that I think is really most impressive. The studies that have used red light in tandem with exercise interventions, as opposed to just the exercise or exercise and diet interventions by themselves without red light. Adding the red light into it oftentimes doubles or nearly doubles the adaptations in terms of fat loss, in terms of muscle gain, in terms of improvements in insulin sensitivity. I mean, it massively amplifies the benefits that you get from exercise, and even can enhance your performance during exercise and so on.

Then you also have, actually, I think that those are the main ones. Oh, one other thing I'll mention that might be relevant to a lot of people listening is, there's some really great research around Hashimoto's hypothyroidism where they've used it there. Really remarkable research where they've shown huge reductions in thyroid antibodies and even a large portion of people, some studies showing like 17 percent. Others close to 40 percent of people able to get off thyroid medications entirely, just from doing red light or near infrared light therapy on the thyroid gland.

So that gives people an overview of some of the research around what kinds of benefits they can get from red and near infrared light therapy. But I digressed a little bit there, so to get back to your question around devices. So as I mentioned at the beginning, it used to mainly be laser devices that were out there which were really, really expensive. And also lasers have some drawbacks related to the devices that are now more commonly used. Which are that they tend to be very small and only be, they're only capable of being used on very small areas of the body at any given time.

Whereas a lot of the bigger LED panel devices can treat big areas of your body at once. There's even one product that's made by a laser company. They used to predominantly make lasers, called Thor Lasers, very, very good, high quality company. They're now making a bed with LEDs, that, think of like a tanning bed style thing. But the whole thing is filled with LED's that instead of U.V. light like a tanning bed, it's all red and near infrared LEDs on the whole bottom of it and the whole top. So you can radiate the entire body from head to toe all at once. The only problem with those devices is they're 100,000 dollars or I think a little over 100,000 dollars.

Niki Gratrix Oh, my God I was going to say I want one. In a way it’s 100,000 dollar sunshine isn't it, we're paying for sunshine.

Ari Whitten Well, kind of. I should mention this because we talked a bit about it earlier. But there are some targeted benefits that you can get from red and near infrared light that you probably cannot get from just sunbathing. A couple reasons why, one is that you don't have U.V. in there, so that you're not going to get, sunlight doesn't necessarily have the anti-aging effects that pure red and near infrared light have on the skin in particular, because the U.V. is creating some damaging effect at the same time. I'm a big fan of sun exposure don't get me wrong, but I don't think that you could make the same skin anti-aging claims for sun exposure that you can red and near infrared light.

So having that isolated red in near infrared light I think is important, also the power output is vastly different. So with a lot of these devices, you can get very high power output localized on specific parts of your bodies and get very deep penetration that you probably are just not going to get with sun exposure. You can also control the dose very precisely, which is also important. So yes and no. So for a long time, a lot of people in this space thought, oh, you can only get these benefits from laser devices specifically, from all

these fancy laser devices that are 10 and 20 thousand dollars and so on, and it's turned out that they were wrong.

Every study that has actually put it to the test and tested laser verses the same wavelengths of light, with a similar dose, but applied from just a simple LED panel – that's what's called a non-coherent light, it's not in a focused laser beam, coherent light it's just light that spread out. The equivalent parameters basically creates the same biological effects. So you don't need a 10 or 20 thousand dollar laser. You can get these effects from an LED panel that costs 4 or 500 bucks. Okay. So that's pretty cool.

Now you do have to spend some money. And I will also issue a warning here that there are some devices on the market that are 50 bucks or, you buy this bulb for 37 bucks or whatever, or even a lot of devices that are 2 and 300 bucks, that are vastly underpowered and will not have the right effects or any effects at all. This is really important, I wasted thousands of dollars of my own money early on before I understood this, before I actually did the math and understood the math of dosing parameters, and what levels of power of the light are needed to actually create therapeutic effects. But you need a relatively high powered light and you also need it to be of a decent size so that you can treat a particular, a large portion of your body at once.

So what I mean by that is, I'll just give one example, one light I bought for 175 bucks many years ago before understood this was a light that was about palm sized, it was about that big. And I'm like, oh, great, it's a red light, and it's got red LEDs in there and there even at the right wavelength. They need to be at the right wavelength and the right power intensity, by the way. So it was a red LED light at the right wavelengths.

But what I didn't understand is that it had one tenth of the power that is needed to create the right effects. And at the same time, by being so small, I can only treat a very small portion of my body at once, as opposed to a much bigger LED panel, that is of the right power that I can treat my entire front torso at once, or my entire back, or I can get two of them and treat my entire body at once. Kind of like that hundred thousand dollar piece of equipment I mentioned earlier. But you can honestly do the same thing by getting two 500 dollar big LED panels, so you could probably save 99,000 dollars there.

So basically getting a device of the right power is very, very important. There are few good LED panel companies out there now, Red Rush by Red Therapy Co., Platinum Therapy Lights, Joovv, Red Llight Man, those are I'd say the big four. Joovv is the most popular one, they've been around the longest, they're most established, they've also done the most advertising and so they're the most well-known right now. They've done a good marketing job and they make a pretty high quality light. But the Platinum and especially the Red Rush, I think the Red Rush are the highest quality lights on the market.

So those are the ones that I get. In my book I also give discount codes and more importantly, I give very detailed protocols and instructions for how to use these lights for all those different kinds of purposes, whether you want to use it for fat loss, or enhancing cognitive performance, or combating neurological disease, or hypothyroidism and so on. There's all these different benefits and I kind of give a breakdown of all the specific protocols and everything that you need to know of how to actually use it. But the basic gist of it is I don't think you need to get a fancy very expensive laser light. Get a big,

powerful LED unit from one of the companies that I just mentioned and that will pretty much be able to give you everything you need.

There are also a couple of specialty devices. One in particular that's worth mentioning is the VIE Light Neuro or VI Light Neuro, its V I E Light is the brand. They make a couple devices, one is an intranasal device which you stick up your nose and kind of clipped to your nostril. That one I do not recommend, the claim is that it's kind of irradiating your brain through your nostril.

According to Michael Hamblin, who's that professor at Harvard, one of the world's most respected authorities on this subject, he basically brushed off the idea that it's actually getting into the brain. He says the light is not nearly powerful enough to actually do that. But they have another device. So I would not recommend that one, they have another device that goes on the whole head and has LED, little light sections that can work in through your hairs and get to the base of the follicles and then irradiate there.

The reason that's important is because hair will block the light. So for treating the brain specifically, it's a good idea to have something that can get light through the skull in a very targeted way. You can do it through the forehead, unless you're bald, you're limited a little bit in where you can apply it with a standard LED light. So if you're interested in treating the brain specifically, that's where something like a specialty device, like the VIE Light Neuro may also be a good idea. But for almost all those other applications, skin anti-aging, fat loss, muscle gain and everything else I just mentioned that goes with red in your infrared light therapy, the LED lights are perfectly wonderful.

Niki Gratrix So Ari, thank you so much, it was a fantastic interview. I think you're writing about such a fascinating subject. The research you've done is getting this therapy out there, it's such a powerful therapy. Thank you so much for the work that you do and I really recommend people buy your book obviously, because that last bit you talked about is really critical to get the dosing right. Less is more with red light and you could waste a lot of money and not do it right. So you've really gone into so much depths in all of that, too.

And I followed your recommendations, I bought the thing that you recommended and I totally have personally benefited, big time, all the way back from September. It worked quite subtly for me, it wasn't like a quick hit, but it's not meant to be it's not a stimulant like caffeine, it was something that I stuck with every day and my health has been nothing but better and better and better. I know that was part of what's bought me back to 100 percent of health again and feeling great. So thank you so much, Ari, it's been fantastic.

Ari Whitten Yeah, my pleasure. Thank you for having me, Niki, always a pleasure to talk to you.

Niki Gratrix Thank you.