Reconnecting and Background

Dr. Sherr. It is a pleasure to connect with you again, my friend. It has been way too long. All right. Likewise. I hope you're enjoying Costa Rica. I am so sorry.

A lot's changed since we last spoke and we last time out in person. You're living in Colorado? I'm living in Costa Rica. Both of us have been exiled from California voluntarily.

Maybe involuntary on some level, but mostly voluntary. So you have also started a new company. Your expertize for people listening has historically been in the realm of hyperbaric oxygen therapy.

You've had a clinic in northern California and you now serve as a consultant for hyperbaric clinics all over the world. Indeed. And you're considered a renowned expert in that topic.

One of the other areas that you've delved into very deeply is something you dosed me with last time I hung out, which was methylene blue. We have a habit of doing that.

Yeah. Methylene blue is is a really interesting substance. And then I'll let you tell the the sort of maybe the official history of it. But my personal history of it is that I've been using methylene blue since I was, like, 12 years old.

Really? Yeah, because when I was young, I was very into aquariums. And sure. It's commonly used. As especially. For the more recent craze of humans using it to enhance their brain and mitochondrial function.

It was commonly used to treat certain diseases in aquarium and in fish, in aquariums. So I've been using it and staining my skin with it for almost 30 years at this point.

Yeah. So excellent. But but there's an interesting history, of course, much beyond my own personal history here of of methylene blue more broadly. So what what is this substance?

Where where did it come from? Yes, we had some really great headlines for our company, actually, within the pandemic, maybe about a year end, how biohacker is and high-performance.

We're using fish tank cleaner to optimize their health. Great clip clickbait headline and it's actually it plays into the history of methylene blue so yes it is used as fish tank cleaner.

It still is used in that way. However, there's a lots of better ways of getting your methylene blue. I promise, if you're going to be taking it as a human and that as.

A fish, actually, that the headline is was exaggerated. It's misguided. So I can tell you as as an aquarium expert or ex aquarium expert, it's not a fish tank cleaner.

It is actually a treatment, a medication for specific diseases on on fish and like treatment of parasites. Yes, exactly. Yeah. And fungal infections, etc.. Yeah.

And so that's how methylene blue got started actually before it became a medical treatment or medical therapy, it was actually used as a as a dye in textile manufacturing.

Methylene Blue Origins and History

This is in the mid 1800s. It was dying. Blue Jeans is the first dye that we used to actually dye blue jeans, the color blue. But somehow and we're not really sure.

In South Africa in the 1880s, they figured out that it treated malaria. Man, I don't know how, but they figured out that high doses of methylene blue orally would treat malaria.

And so as a result of that, more studies were done and more interest of using methylene blue in an anti-microbial capacity started coming to the fore.

So between 1897, when it was the first drug that was registered with the FDA at that time, until about 1950, it was the only antimicrobial around really, and they used it for urinary tract infections.

They gave it to World War Two pilots and soldiers that were in the Pacific Theater, and they had to use prophylactically. And when they were in the jungles in the Pacific, for example, they treated things like trench foot and fungal infections, parasitic infections, and it treated it really well.

The major side effect, as you were kind of alluding to, Harry, is that it does dye things blue and it also concentrates in your urine. So you urinate blue or bluish color, depending on how much you have.

And so they used to have all these World War Two songs about peeing blue and all these kinds of things as a result of the airmen and things having to take methylene blue all the time.

So in the 1950s, when antimicrobials came around, methylene blue became out of favor. However, it became a much more prominent use in the fish tank world, in fish tank cleaner or for treating fish tank or fish infections, as you described it.

It was around that time also that a lot of studies were being done on methylene blue as it became the first the first antipsychotics, actually, the first antipsychotic drugs were derived from methylene blue, something called chlorpromazine, which is a kind of like our old school antipsychotic that used to shoot people up with it that were going through psychotic breaks.

It was derived from methylene blue. And not only that, but it actually included methylene blue in antipsychotic drugs after that, because that's how they would be able to tell if the patients were taking their anti antipsychotics, if they were actually peeing blue.

They knew that they were taking this particular you know, they were taking their antipsychotic along with the compounded methylene blue with it together, basically.

So you had this antimicrobial capacity and then you had this antipsychotic capacity. And actually a lot of drugs were derived from methylene blue that are still in the market today, in the center and the sort of antipsychotic world, and that as a result of its work in a particular capacity called an MRI inhibitor, it basically is called a monoamine oxidase inhibitor.

So very mildly, it increases serotonin, dopamine, norepinephrine in the synapse. So it gives you a bit of a mood boost on its own. And then over the last several decades, this is when it's become very interesting to people in the performance world, in the in the in people in the health and wellness field, basically, because what do we know?

Methylene blue also has been used for a stain for many, many decades. So laboratory people, if everybody who's been in a laboratory before, they probably use methylene blue at some point to stain.

And what does it stain? It actually stains your mitochondria. And that's when things get really interesting is when we realized that it was staining the mitochondria itself.

Okay, so what is the significance of that? Why is it being, I guess, a way of phrasing that to say it's it's staining the mitochondria is to say that it's the IO accumulated.

Yes. Or concentrated by the mitochondria. Right. And so exactly what what what's going on there. So the accumulation of methylene blue in the mitochondria is really where the magic happens because what methylene

blue is doing is it's one of these compounds very unique in that it helps you make more energy in your mitochondria, which is the powerhouse, the energy production center of your cell.

But at the same time, it actually increases antioxidant capacity. Now, most things that give us more energy. Hyperbaric therapy being one of them actually is going to create a lot more stress on the system, a lot more what we call reactive oxygen species, because the more energy you make, the more waste products are the byproducts of energy metabolism that you get.

And these are called reactive oxygen species. They're called oxygen. It's called oxidative stress free radicals. These are all words that are in your audience, are very used to given your work.

Okay. But it's okay to have these in small amounts because our body has a natural ability to increase antioxidant reserve. And we have all these enzymes that get that get induced as a result of this additional oxidative stress.

However, in a significant amount of people these days that are already under a decent amount of oxidative stress because of mitochondrial dysfunction, because of inflammation, infection, post, infectious autoimmunity, etc., they don't have that ability to increase that antioxidant reserves.

And so you kind of give them the ability to make more energy. But then you have all this oxidative stress that the body can't tolerate, and that's when they feel worse than they did before.

And this is something that I found actually in the world of hyperbaric therapy back in when I started, if I was giving them a lot more oxygen, making them a lot more energy, but they couldn't detox well from it, they would be in a whole world of hurt basically in the end, and they wouldn't see the benefits.

So what methylene blue is able to do is not only increase the amount of energy you make, it also increases your antioxidant reserve at the same time. And on the energy side of things, which is this is super interesting and kind of nerdy, but if you have mitochondria that aren't working that well, but you have four complexes on it that are called the electron transport chain, if the first two aren't working that well, you don't make energy well because that's how those first two complexes are taking electrons from your food and making things like NAD and fatty.

Okay, but if those aren't working that well, you're not going to feel good. But methylene blue can actually bypass those first two complexes. So if you're not making well, energy well from your food that you're that you're eating because those complexes aren't working that well, you can bypass it with methylene blue, continue to make energy or regenerate than the energy producing machinery, even if those aren't working that well at the same time, how does it do that?

So it does that by donating electrons. It's something that the fourth complex in the mitochondria called cytochrome oxidase and so cytochrome oxidase is called complex form.

How Methylene Blue Supports Mitochondria

And so what methylene blue does, it induces genes that make more of that particular complex, but it also just donates electrons directly to it. So the electron transport chain real quick is just an energy gradient.

It's just a gradient that's created in your mitochondria so that you can make energy and so what you need for that to happen is what are called electrons.

And these come off our food, but they can come off molecules like methylene blue that donate electrons to electron transport chain and induce the gradient and that allow you to make more energy.

And so that's how it's working. And you know, interestingly enough, there's other things that that also donate electrons to the the complex for that. One of the major things is actually red light.

Near-Infrared light does the same thing. So photon energy, 660 nanometers well described. Well, research also

donates electrons to your electron transport chain via photons via the electron transportation and cytochrome oxidase so complex force.

So this is why we can use them together. Actually, for many people where you can synergize the work of a red light therapy, for example, and methylene blue together and see an enhanced effect.

I mean, you can just go out in the sun and go surfing in Costa Rica, or you could have a red light device, of course, that does 660 nanometers specifically.

Or you could have both. Not saying I know anybody who does that. But not saying that I know anybody here that has that either. Although I don't have as much sun here in Colorado as you, it's stronger than good.

Sun at altitude. You get less spectrum of of UV up at altitude. Yeah, definitely. I'm at 5000 feet. So actually from the longevity research, which you probably know that there's like a sweet spot around four or 5000 feet.

So that's, that's obviously why I'm a deer. So yeah, there's interesting anti-aging effects I had to debates with Dr. Jack Crews about this many years ago because he was this is a bit of a digression but he was railing against altitude, living and altitude as being very harmful to health and talking about the benefits of being at sea level.

And I have no vested interest. No, no, no fight in this whatsoever. Like, no, sure. I live at sea level. I, I have no bias towards arguing about the health benefits of altitude.

But I went and looked at the literature and I just found study after study after study showing that living at altitude was in fact protective of many different diseases.

And was Colorado, where you live, was associated with some of the longest lifespans of any state in the United States? Yeah. Lowest rates of the status of different diseases.

But yeah, yeah, that does play into our topics a little bit here because we're talking about energy production on some level, right? If you have mild hypoxia, so you are mildly like at a higher altitude where we have less oxygen.

Up here I have 16% oxygen here compared to sea level, which is 21% oxygen. So over the long term, as the body has to recalibrate to the higher altitude, there are some some factors that likely play into longevity.

But the challenge that actually I find is that and you know this as well, if you come to altitude, it's a big deal, right? Because if you initially come to altitude, you don't have enough oxygen, you don't have enough oxygen in the air.

You don't have enough red blood cells to carry out the oxygen. You have all these things that are happening with something called your oxygen dissociation curve.

And so interestingly, though, methylene blue might be one of those things that can help people because it helps continue the process of making energy even if there's not as much oxygen around, which is pretty interesting because what happens here is that when we're increasing more energy, what we're also doing is stimulating the whole system to say, oh, now we need to make more energy so the mitochondria are working more.

And so as a result of that you diet, you dilate blood vessels, you get more oxygen to that tissue and you actually increase something called nitric oxide to do that.

And you're also enhancing glycolysis or basically the, the, the breakdown of our food, our glucose into the component parts to go into our mitochondria to help you make more energy.

So it seems to be an altitude remedy for many people. We're also using it for jetlag. For those that are flying for long distances and low oxygen, concentrate ions when they're flying, for example, we have some jet lag protocols that I've developed with Dr.

Ted and others at our company that we really do see a significant benefit for people that are looking to just increase their energy production when there's not as much energy to be made because they're at high altitude.

For example, on the other end of that, on the Antioquia down side of things is also super interesting because we know that it's actually radiation protection.

So we know that if you use methylene blue, it's going to protect you from radiation. If you're at at higher altitude of your on an airplane, for example, you're getting more radiation when you're up on, you know, in a in an airplane, for example, at 35,000 feet, of course, at the same time, we also know there is some protection in the skin.

If you use methylene blue, even orally, because it enhances antioxidant capacity, it's maybe as strong as something like vitamin C and good iron for your for this in some of the skin studies out there.

And so we're using it in that capacity as something that enhances antioxidant reserve. And like a lot of people. Orally or topically. Both. Actually both.

So there are companies that are using a topically and there are companies like myself, they're using orally. But and it seems to work. I mean, there's definitely some companies that are using it topically.

But the challenge, as we've been discussing with methylene blue, is it is a stain. So he's going to stay in. And so getting it to a point where it doesn't stain your skin blue and you don't look like a Smurf, but it still can be effective.

Is is not is still kind of a question on my mind. So I think the way I think about using it is usually more systemically and as giving the systemic optimization the systemic bump for anti-oxidant reserves that way.

Okay. So there's a subtlety of how you're speaking, which I greatly appreciate. And it's, it's, it's very unusual to hear people speak with this nuance.

And I want to delve into this more so people understand it. You're talking about increasing antioxidant reserve as distinct from a compound acting as a direct antioxidant.

So, right. This this is a distinction that I find is is I think one of the big sort of health secrets that exists today. Very few people, including very few practitioners I found actually understand this.

Well. There are many compounds which are framed as oxide, which which are framed as antioxidants, which are not actually antioxidants, which are actually pro oxidants, which have an indirect antioxidant effect from many different phytochemicals, things like sulforaphane, for example.

These are all added stressors. Fall into this category. People refer to it as an antioxidant, but it's actually a pro oxidant that interacts with our internal antioxidant defense systems in a way that that helps build them up to a more robust state exercise is also in this way can be an indirect antioxidant.

By being a powerful oxidant, a powerful source of increasing these reactive oxygen species, it then builds up our internal antioxidant system more into a strengthened state.

Conversely, there is quite a bit of concern and I've spoken to some experts in the in the biochemistry of this of excessive use of true direct antioxidants as down regulating, basically having the opposite effect of exercise or sulforaphane or some of these other things down, regulating the internal antioxidant defense system.

So this let me summarize this the simplistic narrative that most people in the general public and most practitioners subscribe to, which is wrong, is the basic idea that oxidants are bad, antioxidants are good, and we've got to get rid of these bad guys, minimize them of of oxidants.

We got to, you know, antioxidants them as much as possible and suppress them and eliminate them and use as much antioxidants as possible. And that that's reinforced, of course, through all the marketing within natural health

and companies that produce antioxidant supplements, have indoctrinated the general public into that paradigm for many decades now.

Everybody accepts it as true. And I would say 99% of even practitioners and functional medicine doctors still subscribe to that sort of basic paradigm.

Antioxidant Reserve vs Direct Antioxidants

You are part of the exception to that rule in the way that you're describing things because you're aware of everything I just said and you know that there is actually an internal regulatory system of oxidants and antioxidants, that our body intentionally produces plenty of oxidants, which are not bad, but actually serve many vital roles in our body and produces its own supply of antioxidants and that these need to be regulated in the proper balance to one another, rather than just supplying lots of antioxidants to kill off the bad guys, the oxidants.

So the way you're talking about methylene blue is as something that increases antioxidant reserve, but commonly online you will find people talking about it as a direct antioxidant.

Yeah. And let me add one more layer to this just to further complicate things, which is that we also know that when it synergize with red light at 660 nanometers, that this is often used to create an anti-microbial effect due to the production of free radicals.

So let's delve into this story. So what is the truth about methylene blue in regards to is it an antioch's, is it an accident or an antioxidant, or how is it functioning in human physiology?

So, I mean, it's wonderfully said. I would say that it's actually both, which is that's the the crazy thing about it. So it can induce an antioxidant response because of creating more energy, but it also itself can carry or pick up free electrons, which are what reactive oxygen species are and get reduced when methylene blue gets reduced.

So oxidized is usually free electrons reduces means you're grabbing as electrons are no longer as as as volatile basically. And so and not as oxidized.

They're not oxidized, they're not volatile. They're reduced oxidized, reduced oxidized. That's all we're doing really in the mitochondria at all times.

Okay. So a methylene blue does is it actually changes from being a blue pigment to being colorless when it changes when it goes to a reduced form. And so one of the things that we've been looking at is that you can actually titrate somebody's dose to how blue their urine is in some ways.

And now this has not been studied yet, but it works and it's been working with some of my practitioner colleagues that I've worked with, with the products that we have, is that the more stressed you are, the more that you need to give of your mitochondria support.

The less stressed you are, the less you need. So it's like I have a dose that I take regularly and then I have a dose that I take when I'm traveling, it's often going to be higher because I'm not sleeping as well.

I'm under radiation exposure, but I have protocols for all this stuff that I can actually titrate my dose knowing that methylene blue can work in both capacities is what it comes down to.

It can work as an energy enhancer and it works as an antioxidant reserve piece where it can give you more antioxidant reserves. So if you're creating more oxidative stress, which you are because of using more methylene blue, you're also able to neutralize that at the same time.

And that's the beauty of this compound. And so that's why I call it call it an antioxidant reserve, because if you don't need it, it's not going to give you more.

It's only going to be there if you need it. And so that's what beautiful about it. It's sort of a self-regulatory mechanism. And the thing about nothing blue too, is, as we said, it concentrates in your mitochondria and so you have the most mitochondria in where your brain, your heart, your liver and your muscle tissue.

And so we're working with endurance athletes as well that are using methylene blue because it's increasing their energy production capacity in their mitochondria, in their muscle tissue as well, and also building up that antioxidant reserves.

So dramatic stress still happens, but you still have extra antioxidant reserves so you can make gains faster. And so that's another interesting way that you can see this cycle.

There's very few other compounds that do this. And and you made a good point, though, just to reiterate what you said, that the very last piece there is that we are using higher dose methylene blue with light, red light, for example, as an antiviral, as an antibacterial, as an antimicrobial that's usually greater than about one milligram per kilogram of body weight.

Now, our dosing at my company at prescriptions is much lower than that. He's really looking at allowing the body to use it, use it as it needs to, in the sense of making more energy, increasing antioxidant reserve.

But if you need to have more acute need for the energy production or the oxidation, the oxidation piece or the, the, the, the piece of, of trying to increase antioxidant reserve, then you want to go higher dosing and then think about, you know, for infections and, and for, and even for scheming events and things like that where that takes some interesting studies as well.

Mm. Okay. I wanted to ask you about dosing, but yeah, a couple of things before we get there. One is I actually did a bit of a dove into the literature recently to find if there's any studies on methylene blue use in the context of athletic performance.

So it's funny that you just brought that up. I found almost nothing, almost no research that exists on that topic, which is surprising for a compound that's existed for so many decades and that acts on these mitochondrial pathways.

It seems very odd to me that no one has thought to study it in the context of exercise performance. What what have you found in your experimentation with athletes on that?

Yeah, I mean, it's been surprising to us, too, just knowing what we know about how this particular compound works. And I think one of the challenge with challenges with methylene blue is that it's been around for such a long time that it's forgotten about because it's not the new sexy drug on the block that everybody's looking at.

It's off patent. So it's not like a pharmaceutical company can take methylene blue, put their label on it, and charge $1,000,000 for it. Now, there are companies, though, that are looking at methylene blue and derivatives of it.

We discussed this for antipsychotics. They're using this now for Alzheimer's disease. There's a new study, I think it's in it stage three trials where they're looking at 16 milligrams of methylene blue or a compound very similar to it in in Alzheimer's trials.

Right. So they're using it and trying to change it in various ways for Alzheimer's, for cancer, because that's what drug companies do. So they can patent.

It, so they can patent it and they can charge, you know, exorbitant amounts of money to make their margins and everything else. The challenge of methylene blue is that it's been around such a long time that and the resurgence of interest has only happened in the last couple of decades.

And there was a researcher down in Austin, his name is Francisco Gonzalez Lieber, and he's published many studies on methylene blue in cognitive models of Alzheimer's, basically.

And so he's got some really interesting work that he's done. And he's also done some studies on red light exposure, along with methylene blue at low doses for cognitive enhancement.

There's many, many studies that have looked at methylene blue for infection over the years, but you don't have a lot in the performance world. But what I can tell you is that we've been working with athletes, I've been working them with with them specifically on my end, their endurance times go to go up and their recovery times go up too.

And so you can use it in different ways. You can use methylene blue as something you take before you do something as an endurance enhancer. But if you decide to use it afterwards, it also can help with the after the hermetic stress of the actual activity.

Then you use methylene blue as a way to help recover faster so that you can do more work the following day. And not to mention as as we talked about earlier, it's also an MRI inhibitor.

So it increases these neurotransmitters a little bit. They're dopamine, serotonin, norepinephrine. So you feel better when you're doing your exercise.

And I have a couple of clients that refuse to work out without it because they just feel so much better when they're doing it and they can keep their heart rate more elevated while they're doing it.

Athletic Performance and Recovery

This is, you know, anybody from my athletes that are marathon runners to my my moms that are on their treadmills when their kids go to school, I mean, and everything in between.

But and this is not only just for well, people, I think that's really important, too. Like we're working with a lot of patients. I'm working with a lot of patients and a lot of our practitioners that are using our products are using that are using our products for people with chronic inflammation, with autoimmunity, with with with everything that goes around those kinds of diagnoses like fibromyalgia and chronic fatigue and all the things that you, you specialize in, right?

Because if you're giving mitochondrial support, everything becomes easier, especially at the lower doses of the scale of using methylene blue is what we found.

Very, very interesting and linking things back up with the earlier conversation about acting as a direct antioxidant or not, that's also relevant to the to combining it with exercise because we know that the use of direct antioxidants and not a good idea in tandem with exercise often actually inhibits many of the beneficial effects of exercise. So that's that's a concern I always had with methylene blue if it is acting as a direct antioxidant, then maybe it's actually inhibiting the benefits of exercise if you take it too close to that.

Yeah, I mean, we've been looking at that. I think a lot of it depends on the dose as well. So because the higher the dose, the more antioxidant reserves you're going to create in the system.

So lower dose. And so I use this in, in the hyperbaric context as well, thinking about, well, do we want to give too many antioxidants right away if you're going to do a homedics dresser?

Right. A lot of it depends on the person. So if you have somebody that has chronic inflammation, autoimmunity, fibromyalgia or chronic fatigue, they're already under stress and they want to get you to go to exercise.

That's going to make it worse for a lot of these patients. Right. You've had this experience many times over, as I've as I have as well, I could bear or not.

And so if you can give them a little bit of antioxidant, a little bit of energy production, a little bit antioxidant exposure at a time, they tend to do better and then they can do more work and then they can continue on that progress.

And so that's what I typically do is it really is focused on the individual, on the person that you're looking at and working with and saying, okay, this person is under a lot of oxidative stress already.

Let's give them a little a little bit of methylene blue ahead of time as opposed to like your elite athlete. You may think that they're not under a lot of oxidative stress, but they are because most of these people are overtraining.

They're not sleeping as well as they need to. And so they're usually under more oxidative stress than you actually can realize. And so some of my most highly inflamed people that I work with are elite athletes, actually, that are just about to fall off that cliff.

So I'm sure you know exactly what I'm talking about. Yeah, yeah. Let's talk about dosing briefly, because many years ago when I first started not playing with methylene blue for my fish tank, but playing, playing with methylene blue for for myself, the common recommendations that were out there were to use doses that were forget the exact numbers, but very, very small doses, you know, in the neighborhood of like 1 to 3, maybe four or five milligrams per day and it was like point one milligram per kg ish. Hmm.

And I kind of accepted that as a fact or as you know, based on, on good science research. And, and then I decided at some point to delve into the research and start looking at some of the studies.

Myself and I started finding these animal studies with vastly higher dosages. I mean, talking about one maybe in animals, it's like four or five milligrams per kilogram, something like that.

And then in humans there were many human studies where they were using one or I want to say roughly one, maybe on average one milligram per kilogram per body weight.

And so here I was experimenting with, you know, two or three or four or five milligrams, thinking that I was like taking a big dose. I remember taking four drops or five drops thinking, wow, this is a really big dose.

And then I found these studies saying that, you know, there were ten and 20 times higher dosages that are being used in the studies on depression or in the studies on various diseases where these methylene blue have been studied.

So then I started experimenting with a bit higher doses. And, and, but, but I'm curious what you guys have settled on as far as ideal dosing parameters?

Yeah, a lot of it depends on what you're using it for, as you were kind of alluding to in the sense of we have higher dosing, which is typically on the average of that greater than one milligram per kilogram body weight in the anti-viral acute ischemic kind of world.

Those doses can be very effective, but you don't want to take them for long periods of time because they do have potential side effects. I mean, the major side effects would be so we're using that higher dose for things like infection, for example, or gut biofilms.

So Bartonella is one of the more common co-infections in Lyme. It's being used more commonly. Methylene blue is as a synergistic tool, but it's affecting gut biofilms.

So at higher doses you going to start killing off things that you don't want to kill in. You're in your in your gut is what we think. There's also a higher risk of of gastric ulceration and higher doses of oral oral forms.

And in addition, the other thing you have to think about is the half life of methylene blue. So nothing to lose.

Dosing Strategies and Delivery Forms

Half life is about which it means how much of the drug is going to be about half the potency in a certain amount of time is about six, 4 to 6 hours. So if you're taking a very high dose, like a hundred milligrams a day, which some

people are, which I don't recommend, is that that's going to build up in the system over time.

And that's going to cause, you know, pure oxidation at some points. You're not going to get any of the benefits. You're just going to get all that. I mean, although oxidation is not necessarily a detriment, but if it's in overall oxidized, it can cause a significant downregulation or just dysregulation of the system.

So so one nugget per kilogram is sort of where a lot of that work has been done. But where a lot of the new work is being done is a lower dosing for more mitochondrial optimization for brain optimization nootropic function.

So brain optimization function. So when we were creating dosing, we wanted to create a dose that was more in line with the nootropic capacity of, of methylene blue.

And because we knew that if that was the case, that was very likely going to be the sweet spot for what we've been describing before, which is this electron cycling capacity, energy production, antioxidant, antioxidant reserves.

So I call it, you know, energy and resilience. It gives you energy and resilience at the same time. And so that's what I was alluding to some of the studies earlier on the 16 milligram dosing.

And so that's when we decided to create a turkey, which is a dissolvable lozenge that goes between your upper cheek and gums, dissolves there. Or you can swallow actually if it's just pure methylene blue itself, there's methylene blue so highly bioavailable that the thing that we made these turkeys for our company, because turkey is a really great delivery device to create a direct vascular diffusion into your brain, basically from up up in your cheek.

And it's highly vascular in here. So it works faster if you do it that way, but you can still swallow them as well. The other reason is actually in some of the other products that we have, some of the ingredients are not as highly bioavailable, which means that they'll get digested by the system, by the liver and make them less, less active or deactivate them.

So if you dissolve in your mouth, it doesn't happen. So we have two products that have a combination of things that are better dissolved in the mouth for that reason.

But nothing blue in a turkey form is whether you swallow it or why you dissolving your mouth. It's going to get all in your system because nothing is one of those other interesting molecules.

Very few like this that are very highly bioavailable, no matter if you swallow it, if you get an IV, it's almost the same, which is very unusual. Most things, if you get orally, if you take orally, like NSAID or cysteine, for example, is only about 10% bioavailable, which means that 90% of it gets deactivated by your liver.

But if you take it I. V. and AC, it's 100% bioavailable. So I don't recommend that. But just as an example, you know, for people. But anyway, so we used the 16 milligram dosage because of what was being studied in Alzheimer's disease.

And our Cherokees are very easy to dose instead of the drops, which are very difficult to direct to dose, as you probably remember. And they're they're very, very messy.

You can take our turkeys and cut them into quarters in two halves and four or take a full Cherokee. And I've been surprised, Ari, I mean, some people will get massive effect with just a four mg square of our full Cherokee.

And I think it depends on their mitochondrial optimization status and also what they need in the sense that, like sometimes you want to get a little bit of support when people are really sick as well.

You don't want to give a whole lot because it's going to cause more dysregulation potentially as well. So that's how we got to our dosing, which is, you know, very low dose.

It's lessened, you know, it's less 1.5 milligrams per kg. And but there are reasons to use higher dosing. As I

described. Okay. So lower dosing is you're going to see more of the mitochondrial enhancing brain enhancing effects.

Right. And synergy with red light as well in that capacity. But if you want to go higher dose like higher methylene blue like so in the kind of COVID world, post-COVID world, we were using a lot of these things even though we weren't supposed to.

And we were helping a lot of people in combination with red light and high dose methylene blue and and adoption therapy and all these kind of things that we couldn't talk about or else we would all, you know, get sued or fired or whatever.

That's why you live in Costa Rica, right? Nobody can touch you now. Right. Okay. So but anyway, so for me, like, you know, this is this this is all a big deal as a clinician.

But, you know, we we do know that like lower doses of methylene blue with red light is a fantastic mitochondrial optimization synergy energizing thing to.

Okay, let let's talk more about that piece. Why why why is it synergistic? Because what I've seen, there's plenty of research on the fact that there is some kind of interesting synergy between methylene blue and red light, specifically at 660 nanometers.

Right. And typically what we find research on is the production of singlet oxygen free radicals basically that end up being selectively toxic to, for example, viruses.

And there's even research on this in the context of COVID and using in blood transfusions, taking the blood and putting methylene blue in it and irradiating it with red light and it killing the COVID, SARS-CoV-2 virus, among many, many other studies.

Right. And other viruses, too. And also in photodynamic therapy, in the context of cancer being selectively toxic to cancer cells. Right. So there is this, again, methylene blue red light synergy production of free radicals, toxicity to these harmful things, viruses, cancer cells and so on.

But the way that I'm hearing a lot of people talk about it now is that there's there's there's sort of this allusion to allusion to like a magical sort of synergy. Yeah, right.

Like the red light activates the methylene blue and makes it better, like makes it more effective at boosting your brain function or your energy levels and so on, which I'm open to the idea.

That's true. I just don't know the the scientific mechanisms that underlie that. So is it is it an automatic effect from the production free radicals or what's going on there?

It is simply a synergistic effect in the sense that they're both working on the same complex in the mitochondria. That's all we know in the sense that so if you have energy coming and being produced because you have more red light, you're going to get more energy produced also because you have methylene blue around at the same time.

So that's all the research that we have thus far, at least on low doses. And that's why we think people, you know, will subjectively feel better when they're using them in combination.

So is it? I do not think that the oxidative load piece is really playing a huge part in this at the lower doses of methylene blue. In fact, it might be that because we're using it at low doses, we're kind of we are we're neutralizing some of that oxidative stress that's happening in a very like almost like equal kind of term in the sense that you don't have a lot of stress that's happening because you don't have as much methylene blue around or as high of intensity, red light or photodynamic therapy.

Now, if you had it at a higher intensity photodynamic therapy, red light or your higher dose methylene blue, that's

when you're going to create more of these singlet oxygen, as you're describing, and that's how it's being used and things like cancer and infection.

So I think that's the difference is that lower dose your have enough capacity either on your own right because of your antioxidant reserve along with methylene blue to protect you from stress from that system, from that synergistic effect.

I think. Got it. Got it. Yeah. When it comes to the brain side of this and the altering of levels of, of neurotransmitters like dopamine and serotonin in the brain and mayo inhibition, do you see any potential consequence for long term use?

Like, for example, the chronic use of caffeine, the most widely used drug in existence absolutely has massive negative effects on neurotransmitters and systems in the brain with chronic use, with short term use, acute use or intermittent use.

It works wonderful to create those short lived effects, but when you use it, especially multiple times a day, every day, you really disrupt the the adenosine system in the brain in a pressure where it becomes dysregulated and you have side effects.

Most people are of course, unaware of what those side effects are. But for people listening, it lowers your baseline levels of energy and mood and cognitive function and makes you dependent on the caffeine in order to function normally.

But answers your hormones up over time and things like that too. Yeah, yeah, yeah. So do you see any issue like that occurring with methylene blue? Well, a couple of things come up.

I think the first thing that that I like to describe is something that we call at our company, health optimization, nootropics versus performance optimization nootropics.

So Doctor Ted, who, you know, is the founder of the transcriptions company, Dr.

Red Light Synergy and Mechanisms

Ted out, of course, a very smart guy, but using methylene blue nicotine, caffeine, all these other kinds of ingredients that we use in our products for various reasons and multiple years before they were cool kind of thing.

And what we realized, though, is that the definition of nootropic is really focused on the performance side. So people think of nootropics as something that's going to help make them perform better.

But what they don't think about is, is it something that's healthy for the brain or is it something that's going to clock your brain over time? So a good example of a performance optimization nootropic you just nailed it is caffeine.

Caffeine enhances the production or the release of a number of neuro neurotransmitters. It plays with the adenosine receptors and the adrenaline pathways, and it does all these kinds of things to the brain and hormonal systems as well.

So in the short term, it can make you help, make help you make more energy, make you feel more awake and alert. But over the long term, it can clock the system and make things just regulate.

Same goes with another product that we use in one of our one of our products called Blue Canteen. We use nicotine in that one and we use nicotine and caffeine along with CBD and methylene blue and something called blue carotene that helps with focus concentration, you know, like it's your, you know, your Adderall equivalent basically without the jitters.

And it's it's fantastic for 3 to 5 hours. But is it something you want to use all the time? The answer is no, because it

has these performance optimized, optimizing nootropics in there, like nicotine and caffeine that are great for short term benefits or maybe even some long term benefits.

But over the long term, it can still be an issue. Now, the thing about methylene blue is it actually has both capacities, as we were describing before.

I just now actually with neurotransmitter release this is what I would put into the category of performance optimizing because it's increasing serotonin, dopamine and norepinephrine in your synapse.

So it's increasing your your energy production systems as a result of that. But at the same time, it's it's increasing energy production in the in your mitochondria directly as we described in detail already.

And it's also increasing antioxidant reserve. So it's not necessarily just a performance optimization nootropic, but it's also got health optimizing capacity as well.

So it's protecting the system at the same time is is helping make more energy. So this goes along with its use in our blue canteen, for example, we use methylene blue in there because it's got both capacities and we use CBD in there too because CBD, as well as what we would call a health optimization nootropic capacity is increasing the the production or the the circulating numbers or the amount of something called Ananda mide, which is a neurotransmitter that's responsible for bliss and for decreasing, etc.. So what it comes down to is that we think that methylene blue is protecting itself from itself, basically because it's got this ability to to cycle to increase antioxidant reserve.

So I don't see it as an issue over the long term. Now, of course, you want to measure what people need over time. And I'm not saying that everybody everybody's taking methylene blue for the rest of their life either.

I think that it's something that could be great as a as something that people use regularly for health optimization. But I also think it's really helpful when people have a lot of inflammation, a lot of antioxidant need, and they have a lot of you know, they have brain fog.

They're they're dealing with long COVID symptoms. They're having lots of inflammation. And it can be used in low doses to help support the system. While you're doing the harder work of helping you optimize the system over the long term.

Yeah, very well said. Is there any aspect of this that you think we haven't touched on? That's important for people to hear? Yeah, so we talked a little bit about contraindications, but not a lot.

So when it comes to methylene blue, it's a very safe compound. It's been around since 1897, the FDA, but it's stamp on. It's now grandfathered in and you can get it over the counter.

You can get it you can get it by prescription as well and still possible to use. Doesn't it have some distinction as like the first or one of the first prescription drugs ever something the first.

Yes, the first drug that was registered with the FDA. The first prescription drug. Yeah, absolutely. And so now it's used in hospitals and used in clinical practice all the time.

It's still on the world World Health Organization's list of essential medications, actually. And this is for for cyanide poisoning, which hopefully nobody will get that's listening.

But also carbon monoxide poisoning, if you don't have a lot of oxygen around, you don't have a hyperbaric chamber around. This is a very significant remedy for that because it helps oxygen bind to the hemoglobin molecule and red blood cells better as opposed to if you didn't have methylene blue around.

So it's been around a long time. It's very safe. But there are certain populations that should not take methylene blue and the major ones are if you're pregnant or breastfeeding.

There are some studies that if you're pregnant and pregnant and taking methylene blue, it could be a teratogenic. You know, it can cause, you know, deformities and in fetus.

So don't take it in. Breastfeeding is a little more iffy, but probably not.

Long-Term Use, Safety, and Contraindications

And then also there have been studies that looked at high dose methylene blue and high dose SSRI are drugs that block serotonin reuptake whether it be as a surprise or some of the newer drugs that are combination drugs and that potentially has a theoretical risk of something called serotonin syndrome.

And that is when you get too much serotonin in your synapse and basically can cause a dysregulation of everything and you know, people can die from that.

But there's only been one reported that in the literature, and it was very, very high dose methylene blue, like something like 40 milligrams per kilogram or something ridiculous like that.

So like very, very high. And so but as a company, as, as, you know, we say that you really need to think about if you're taking an SSRI drug, we really need to talk to your practitioner before you think about adding it into your regiment.

I mean, there are some ongoing studies now using methylene blue as an antidepressant itself. Now, again, it's a derivative of methylene blue because nobody can patent methylene blue itself, but it's being used in studies with depression and bipolar disorder and other mental health issues because we know it has this capacity.

So but just, you know, that that's the major thing to be thinking about is that and then the other thing is a very high dose methylene blue. If you have a genetic inherited genetic disorder called G6 deficiency, which is very, very it's rare but not terribly rare if you live in like the Mediterranean area, North Africa, Mediterranean, Greece, Italy, etc., very high dose of methylene blue can cause your red blood cells to start breaking now very, very rare again in our dosing.

Not an issue, but if you're thinking about using higher dose, a greater than one mg per kilogram, it's something to consider before you would started a regimen of a very high dose, at least for me, even if.

Somebody had g six PD. Yes, exactly. Yeah. Yeah. If you had that, you want to make sure you got tested for that and. People would know if they they have that presumably most likely they.

May not know. So that's the thing. So they may not. So this is not something that may cause an issue. And in most people, actually, it doesn't unless they get very sick for another reason.

And so if you are thinking about taking high dose methylene blue for a long period of time, I would get that tested. Yes. Okay. It's like if you're going to take high dose of vitamin C, it's the same thing.

People will get checked for G six PD deficiency before you take be vitamin C at high doses for that same reason. But but again in general very very safe across multiple it's still used in Africa now it's coming back as a a treatment for malaria actually because a lot of the drugs that we now use or have been using are now resistant against or the malaria is resistant against the drugs itself.

So so it's coming back for that reason. A doctor. Sure. There's one thing that I want to make sure we communicate adequately, and that is simply this subjective benefits of using this.

So like what kinds of things are people using this for and what kinds of results are people as a result of using methylene blue? Yeah. Thanks, Ari. I think that's really important.

What I said as we were discussing is really the the key. And that's just two words, energy and resilience. So people

feel more energy and they feel more resilient to day to day stressors, operations, whatever it be.

And within that, you know, I've been working I'm the head of all the practitioners that use our products at our company. And so I work with other practitioners that will take our products and use them with their patients.

And I've been amazed at some of the things that I've heard honestly. I mean, sometimes it's symptoms that have been going on for six or eight months from long haul kinds of COVID things with brain fog fatigue, and they take methylene blue in a couple of days.

Their symptoms are done, are vastly reduced. I have had people with it, but it comes down to is that when we're increasing energy production, what are you going to see as a result of that?

So you're going to see people's focus get better, their concentration get better, their brain fog get better, their energy overall get better. And so that they feel better in these capacities.

But outside of that, I've had people with joint pain go away. I've had people with blood pressure problems, see significant improvements, if that's often if there's an inflammatory component to a lot of these things.

Right. And so and then I've had people, you know, also talking about endurance and like their athletic activity is getting better, the recovery scores getting better.

You know, oftentimes people are using methylene blue in the mornings because it gives them more energy. But in some people, actually, they're using it before they go to bed because it helps them sleep better, because sleep is not a time when we're just kind of relaxing and our brains are very highly metabolic, especially during REM sleep.

So their RAM goes up and their and their recovery gets better as a result of it. So I think in essence, the way I think about methylene blue with with the work that I do in clinical practice is like, do my patients need more energy or resilience?

The answer is yes. And the question just becomes, when is methylene blue? Something that I could consider using it, something I should use now? Should we look at optimizing mitochondrial function a little bit beforehand?

Subjective Benefits and Clinical Use Cases

But oftentimes it's whether I'm using it before or after a certain technology, which is hyperbaric oxygen therapy. Am I using methylene blue before? I'm using it after, and how am I using it?

Because in almost everybody, I feel like we can see that a part of why they don't feel as well as they want to feel is because their mitochondria aren't working as well as they want them to work, or as they used to work when they were 20 or 30 years of age.

And so this is when I think about using in the context of optimizing your health, not just thinking like a simple pill or a compound or a toki in our case is going to make you feel better for the rest of your life.

Like it really is the context of the nonprofit organization that we have that we donate money to at prescriptions at. My company is called Health Optimization Medicine.

In practice, this was developed by the same people that developed my company, our company. This is founded also by Doctor Ted Akiko. So we were talking about before, but the idea is that we're looking to help people through a journey of optimizing their health rather than just treating a disease, looking at foundational biomarkers via vitamins, minerals, nutrients, neurotransmitters, gut health hormones, and then creating a health optimization plan for patients or clients that creates all of these things in a in a in a very holistic way.

And then that's when it's best to use things like methylene blue, because then you can help support the system while you're doing the hard work of of shifting vitamin mineral and nutrient hormone networks and things like that.

So the context is key. I don't think I have a magic blue pill for everybody, blue Cherokee in my capacity here because of our company. But I do think it could be added to regiments, especially when somebody is on that path to optimizing their health.

Doctor, sure. This has been a pleasure. Brilliant stuff. Thank you so much for coming on and sharing your expertize with our audience.

Where to Learn More

And the last thing is, where can people learn more about your your products? Yes, thank you, Ira. This has been great. I really appreciate the time and your your interest in something since you were 12 methylene blue and very cool so you can find more about my company I transcriptions it's the word prescription and Cherokee in the opposite capacity Cherokee and prescriptions combined into the word transcriptions and we're on Instagram where you can find us on website transcriptions dot com.

There also be an available book e-book for you for this summit that you'll be able to download that gives you more information on methylene blue as well that I wrote a while back.

That really gives a good rundown of what we discussed today in more detail. So those are the places. Beautiful. Thank you so much, my friend. Great catching up with you. I look forward to our next conversation.

Likewise. All right. Thanks so much.