## Introduction to Methylene Blue

And what this means is that methylene blue is one of the only compounds that we know that has a capacity to enhance the capacity for you to make energy.

So allow you make more ATP and at the same time help you work just like a detoxifier, just an antioxidant itself. And so directly as an anti-oxidant and indirectly, it also enhances a couple of pathways that increase glutathione production as well.

There's very few compounds. I only know of one other one actually that does both. Rather than being more like gasoline powered car, Methane blue is more like an electric powered car where it helps with energy production, but doesn't leave any exhaust on the other side of it.

So you're helping with. Energy production. But you are not having the challenges of the enhanced energy with the ATP and also the reactive oxygen species that you would make along the way.

That's why it becomes very supportive for the system. Your health is shaped by more than symptoms. Through real stories and expert insights, we explore how your genetics, environment, and daily choices affect your wellbeing.

We uncover root causes and share practical tools to help you find the healing you need. Welcome to the Forum Health Integrative Medicine Podcast. Welcome back to the Forum Health Integrative Medicine Podcast.

I am your host, Amanda Grabeau, and I'm so excited to introduce Dr. Scott Schur. He is the co-founder of Troscriptions and he is also the Chief Medical and Health Education Officer.

And I also have our cohost, Dr Andrew Peterson, the chief of staff of our Forum health organization and also, The medical provider in our forum healthy Orem and West Jordan.

So today, I'm so excited to have you on we are going to be talking about methylene blue and I am especially excited about this because I don't know a lot about it and that's a very new thing for me.

So I've got so many questions and i'm, so, excited, to explore this. One thing I do know about Methylene blue is that it really interacts a, lot with the mitochondria.

so I kind of wanted to take a step in that direction first before we got down the methylene blue rabbit hole so that our audience has a little bit of context.

So Dr. Peterson, can you tell our audiences about mitochondria and what it is, how it works in the body, and all that good stuff? Thank you both for having me and it's nice to be here.

I think the first thing to say is that, so I have a 15-year-old daughter, she just had her science biology cell class and when they learn about the cell and then there's a nucleus and there is a cytoplasm and a cell membrane and this one mitochondria in there that makes all of this energy.

And what you learn very quickly when you start learning about mitochondrial medicine is that, yes, it certainly is the powerhouse of the cell. It makes the energy.

That does a lot more than just make energy actually, but for the sense of, for right now, let's, focus with that. But there are some cells in our body that have thousands of mitochondria per cell, and we have some in cells that our bodies have very few.

In fact, there's one human cell that has zero mitochondrion. Do you know which one this is, Andrew? I'm going to guess it's the red blood cell. You got it.

And so yeah, the Red Blood cell was, I was going quiz you, Amanda, but I figured I would quiz Andrew first. Oh, nice. Nice. Yeah. The Red blood cells used to have mitochondria, But as they mature, they get rid of it so they can carry more oxygen.

But there are a couple of places where we have thousands of mitochondrial per cell that are especially important for people to know. The first or the place with the most mitochondria per cell may not be the one that you're both thinking about.

## Mitochondria and Energy Production

Do you both have an idea of what the places or what's the cell type in our body that has the mitochondrial percell? It's not the brain. That's number two.

I was going to say it would be macula of your eye. Really? The heart is there too, but it's actually the ovaries and the sperm. So eggs, egg cells and sperm cells have the most mitochondria per cell.

That makes perfect sense. I mean, what's biology about? Can you exist? Exactly. Right. And the eggs are the number one sperm and number two. Then after that, it is the brain, the heart, liver, and musculoskeletal tissue.

The eye has a lot too. Especially the muscles around the eye because we're using those muscles all the time. So the first thing to think about is that we have a lot of energy demand in specific types of parts of our body.

And the more energy that demand that have, the mitochondria you're going to have in those particular places. And so, well, the issue here is that the statistics are pretty crazy where 94% of US adults have some element of mitochondrial dysfunction.

And, and so what does this mean? This means that this part of the cell that's trying to make energy for all of us is not meeting our energy demands. And this energy is what we call ATP, Adenosine Triphosphate.

And fun fact, we make about 150 pounds of ATP every single day to maintain our energy demands. That is a huge amount of energy. It doesn't stick around for very long, but that's how much ATP we're making now.

When we're making energy, we make the energy but we are more like a gasoline powered car, not like an electric powered. What we do is we also make water, carbon dioxide and what are called reactive oxygen species, these free radicals.

Some of these are important because it helps really do what mitochondria do best, which is sense and process information and allow us to understand how much energy we need to make and how we should not be making.

So some of this are okay, but if we have too many reactive oxygen species, too much in the system, and we don't have enough antioxidants to be able to neutralize that stress, the system starts breaking down and over time the mitochondria get less effective at making energy overall.

And so what the Mitochondria are really doing in essence, Amanda, are taking the inputs we have from our food, basically our fat and our carbohydrates, the electrons from food and bringing them into the and converting that electron energy into energy that our cells can make in the form of ATP.

In the process, we're converting to ATP, also water, carbon dioxide, and reactive oxygen species. And that carbon oxide is supposed to go to our plant friends and they're supposed bring that dioxide in and make oxygen for us.

The beautiful cycle is suppose to continue. Aside from carbon monoxide, aside from leaving all those plants in the dust and the Amazon rainforest and all the other things and living in environments that have no fresh leaves or

plants around you and I could go on.

There's a lot to say here, but the main thing to stay is that most of us can't meet our energy demands because our mitochondria aren't working very well.

I love that and I just want to highlight again sort of those cycles. I think it's so – we like to think of categorized things as good or bad, right?

CO2 is currently bad. Right? Don't tell that to a philodendron or a cactus. Or even us. We need CO 2, man. Absolutely. And we – I thing we treat free radicals the same way.

Oh, antioxidants are good. Well, yeah, they are in the right amounts. Everything is good and everything is bad in in wrong amounts, right? So those unpaired electrons that we need to pair, yes, it's good to have that process going.

But they're not all bad. They do send signals and they critically important signals. So I think that's just important for people to hear and understand and say, oh, so this is a system.

This is cycle. It's a big circle that happens that keeps life going. And really that organization of energy is the miracle of life. It's just beautiful.

Indeed. it runs everything, right? I mean, and that's really what it comes down to is that we have these amazing ancient bacteria in ourselves. If you believe it, but that really is what evolution looks like to be the case.

that ancient bacteria that are producing a huge amount of energy to power every single thing that you do every, single day that your alive, right? And so our goal is, is interesting, because we want to live for as long as we can.

But the longer we're around, the more stress making all of that energy is on the system. So what is aging really, but a dysfunction of our capacity to make energy effectively over time.

And there's many other aspects to this, but in the end, at least maybe I'm biased in how I think about this is that it's a mitochondrial thing because we are sacrificing rust in our system to make energy for as long as we can, live as Long as We Can, right?

And in essence, it wouldn't have mattered 10,000, 20,00 years ago, because we lived until we were 40 or 45 years of age at the most, except for maybe a couple of people in the village that lived longer so they could pass along the stories of the next generations.

Because we would die of disease and starvation and other kinds of things. And so it really wouldn't have mattered back then as much. But to live a long, healthy life is not just about longevity, right?

It's about living as long as we can as healthy, as well as until we die very quickly. Right? Yeah. I mean, from a biological perspective, we really only need to Human offspring are fairly fragile and they can't grow up on their own, right?

So we do have to live long enough to get our children to some level of independence, and so we have do live a fairly long time compared to other animals, like rabbits hop off from their mom, they bounce away.

after a few months and don't worry about mom anymore, right? But we need our kids with us till they're at least 16 before they can go off and do their own thing.

Now, of course, that would seem irresponsible, but that was certainly the case, you know, even 200 or 300 years ago. Right. Biologically, we do not need to live to be 85. The biology wasn't designed for us to life that long.

Biology was designed or evolved for to us live about 45 years. Right. And that's why menopause is around that time too, right? This is the time that wasn't really required for us to be around.

So if you want to live healthy lives, we have to really mind the machinery that allowed us be so sustained at those younger years, but doesn't have the same capacity as we get older and sometimes can be detrimental if we're not really understanding the biology and physiology of it.

The challenge is not only that we don't live 10,000 years ago is like, we don't live 10,000 years ago at all. And we have all these inputs that are coming in that, are making things even harder.

Like when you, I'm sure you have a lot of patients like this, as I do rancher that didn't getting sicker much younger just because of toxicity in the environment and the stress that we're all under all the time, you know, infections and other things.

Stress microbes and stress toxins, microbes, those are the big threat. Yeah, and insulin resistance is a big one too. Our food quality, even the nutrition we put in our body is so different from years ago.

We don't have the same fuel. To your point, these mitochondria, they're powering everything in your body with the exception of the red blood cells. And I, fascinating that ovaries and testes, I could have sworn it was the heart, but that makes so much sense also.

At Forum Health, we uncover the why behind your symptoms. With advanced lab testing, hormone optimization, and cutting-edge therapies, We help you heal and perform your best.

And now, through shopforumhealth.com, you can access physician-grade supplements trusted by our providers, supporting everything from adrenal health to focus and longevity.

Learn more at forumhealth.com and explore supplements at shopforumhealth.com. And we're badgered with far more toxins than we ever have been in previous years.

Our food quality and the nutrition, even if you're eating, look at I got all of my veggies in today, I've got my fruits in, today I have my fiber, my protein.

The fact of the matter is, is that the veggies today are different from the vegies five, 10, 15, 20 years ago. You see all these posts to like, look at the food that I like.

I used to eat this when I was younger. Great. Your food 20, 30 years had three ingredients. Take a look. At our labels. Now there's. ingredients nobody recognizes.

So people are getting more and more stress on their body earlier and earlier with less fuel and ingredients that your body needs. It makes so much sense that people getting sicker, younger.

Yeah. All makes sense. Well, let's turn our attention to Methyl and Blue. Yeah, it's been around for over a century. I did a little bit of homework, not too much, because I wanted you guys to teach me.

But it has been… It's one of those things where…

## How Methylene Blue Supports Energy and Detox

Yeah, I mean, what I would say about Methylene Blue is that when we're talking about mitochondria, it has very unique properties that have been really discovered over the last 120 years or so since it's been around, but really over last several decades is where things have gotten very exciting.

And with Methlene Blue, It was first developed in the 1870s, one eight seven zero. So a long time ago, he was the first drug register with the nascent FDA back in 1897. And was it really about that?

That drug registered with the FDA. Yeah, yeah. That's fascinating. I love it. And it's the first, don't get scared everybody, the fully synthetic drug ever developed, right?

And so when you hear that as a clinician in the world of integrative and functional and all those kinds of medicine, you're like, what? Synthetic? I don t want anything synthetic, and then I have to have the conversation like look, Do you live in the natural world anymore?

Do You live with all natural inputs? No, you have synthetic things all around you all the time. Sometimes we need synthetic Things to help us in this synthetic world we live In.

So I think it's also easy to push back and say, The idea that something being natural makes it inherently safe is misguided. Arsenic is natural, right?

So most of the mushrooms are natural. Or the ones that will poison you to death from liver failure. I saw that in medical school. Yeah. You falling on a sharp piece of bamboo and being stabbed to Right?

Lightning, being struck by lightning is natural. There are a lot of unsafe and natural things, so. 100%. And that's the other side of the coin that I always say as well is like, not everything natural is good for you.

And so, yeah, when it came out in 1897, it actually was called a magic bullet at the time, which is interesting, right? Because the reason why it got the, what's that?

I said that that is fairly prescient. It is, yes. They knew more than they thought. Yeah. Well, the reason why they called it that at the time is that you could give very high doses of methylene blue to kill pathogens and it wouldn't harm human cells.

And so that's why its first indication was malaria actually. It was given at very doses, like 12 milligrams per kilogram of Methylene blue, which is much higher than I would use in clinical practice now by a long shot.

but it would kill malaria and still does. And from about 1897 until 1950, it was the premier antimicrobial. It's coming back around in this way. At higher doses, about a milligram per kilogram or a little bit higher than that, increases the amount of hydrogen peroxide in the system.

And hydrogen peroxide you can buy at the store, but it's also a fantastic anti-infective that our cells use on a regular basis to kill off fungus, virus, bacteria, protozoa, parasites.

And so you could use for dysbiosis. It can be used for parasites, it can used viral infections, and this is the stuff that I'm seeing in clinical practice now at higher doses of it.

I love that example and I like to share with my patients that we make things called peroxisomes which dump out the hydrogen peroxide, right? Like this is part of our immune system and it's one of the classic examples of oxidative medicine.

right? That is happening in our bodies. And this has to happen and this is why we need oxidative stress on the system to be able to kill bugs and there's a lot of even kill cancer cells like that's another really big one for people.

So this hydrogen peroxide production is pretty impressive and from about 1897 to 1950 as the premier antimicrobial it was used during World War II. If you were a pilot or you are in the military and you were going to the Pacific theater, you are taking methylene blue prophylactically, and they would sing songs about going blue in the loo, which is because methyline blue makes your urine blue.

It concentrates in your urine and that's how it's excreted. And what's super interesting about methyllene blue, I get to this in a minute, it was like it is the next sort of, one of the chapters is that it goes from blue to colorless in this system.

I mean it changes colors, depending on its redox state. And so, but you'll find that as it comes out, it will be blue. But if you, if your under a lot of oxidative load in general, you know, take longer to get blue at a higher dose for people.

Interestingly enough. That's interesting. And, and so there's other, I do love the blue urine. I'm a BYU fan. You know? If you're a Michigan fan, blue, urine, UCLA for me.

So there you go. Yeah. Blue urine as well. Blue and gold. You can have it both ways. Indeed. So depending on the urine, like if you want to do some B3 or some vitamin from vitamin B and get some complex in there.

I'm going to need to turn mine into green. Yeah. Do some vitamin B complex with your methylene blue together. You've got some green urine there, Amanda.

We're good. I cannot have blue because the bears, right? They're blue. It's not that dark. With methylene blue in the 1950s, because penicillin and other antibiotics came around, it wasn't as interesting anymore to use it because we had new novel compounds that did nuclear bombs to our gut, as we all know with a lot of these things.

But they were very useful at the time, of course, right? You fast forward a couple different decades. The way I first learned about methylene blue was in chemistry class because in biochemistry, you use methylened blue as an indicator to look at the mitochondria in the cell and it stains the mitocondria.

And so for years, they understood that something was happening with methyline blue in a mitochondrion, but they weren't sure exactly what. Then it was really started to be well understood, that it had this amazing capacity to what's called redox cycle.

What this means is that Methylene blue is one of the only compounds that we know that has the capacity to enhance the capability for you to make energy, so allow you make more ATP, and at the same time help you work just like a detoxifier, just an antioxidant itself.

And so directly as an anti-oxidant and indirectly it also enhances a couple pathways that increase glutathione production as well. So there's very few compounds, I only know of one other one actually, that does both.

Rather than being more like gasoline-powered car, Nothing is more like an electric powered car where it helps with energy production, but doesn't leave any exhaust on the other side of it.

So you're helping with. but you're not having the challenges of the enhanced energy with the ATP and also the reactive oxygen species that you would make along the way.

So that's why it becomes very supportive for the system. And we have patients that are walking around right now mostly with a combination of both, with combination with energy production issues and detoxification issues as well.

But complex one and complex two in the mitochondria specifically, are hammered by modern society and the diseases of modern Society, insulin resistance, medications that we're taking on a regular basis, the stress response, pesticides, like Roundup, for example, right, is a complex one destroyer, and so If you start adding in methylene blue at very low doses, like four, eight to 25 milligrams is the dosing I found.

What you can find is it can bypass complexes that aren't working very well. So you're going to enhance energy production. It can help recycle some of the complexes to help them work better and increase the number of density that you have.

And at the same time, it's not causing stress on the system by just making energy without giving you detoxification capacity at So these lower doses, much lower than the anti-infective doses are extremely powerful in my clinical practice and just overall from a clinical picture as a bridge for so many patients that are coming in with a place that having such severe or significant issues with mitochondrial function.

And then we can give them this bridge of using Methylene Buid to help them get through a lot of these initial stages that really difficult as they're trying to get better.

So, methylene blue is not only neutralizing oxidative stress, it's improving the efficiency of the energy system itself,

the mitochondria itself. Correct, right.

So there's very few compounds that do that, and what I always talk about, so a good example of this is somebody does like a sauna protocol for detox. They're taking their glutathione, they're taken their binders, taking there antimicrobials, whatever.

And that's all good stuff. And they're using the sauna to help mobilize and sweat and they come out of the Sauna and feel terrible. They feel like they just got hit by like a brick wall or a bus.

This is the thing, right? If you're helping clean up and detoxify, that is great and amazing. But if you don't have the capacity to make energy, you are still going to feel terribly.

Even with all that detox gone. The liver itself has so many, like that's another organ that has many mitochondria and it has to work so hard today to get rid of the toxins and the stressors that we come in contact to.

When you get in a sauna, what are you doing? You're releasing toxins from fat cells. Yes, you're excreting them through your sweat, but your body is still going to have to be processing some of that.

You are still dumping a load of toxins into your bloodstream that your liver has to increase its energy production to clear out your system. Exactly. What you'll find is that when you're increasing this detoxification, but you add on the methylene blue with it, you don't feel wiped out when get out of a sauna because you had enough energy support along the way to help mobilize, to support the detoxication system at the same time.

So again, it's very, very interesting the ways it works. I'm going to highlight, again, what you just said, Amanda, that when you're in a sauna, you do sweat out some toxins.

I think people have this misconception that they sweat most of the toxins, I sweat a small fraction of those toxins and most toxins still have to be processed through the liver.

If you don't jump in the tower right away, you can reabsorb them into your body. Even if you did, we're still only sweating out a fraction of them. Yeah.

A lot of toxins are just being mobilized, right? It's not like you're a wash rag and you just get wrung out and all the toxins go out. So we're demanding an enormous amount of our liver when we do that, right?

If you think about it, we actually get rid of more toxins by exhalation than any other form. But it's primarily CO2, but some of these, yeah, exhale those toxins.

But you deeper has to do so much work and you just rearranged most of the deck chairs. And so it's a mess. You're going to feel awful if you don't have energy to all that work.

Right. I think for the listener at home, the patients, I don t think they understand necessarily how much detoxification is going on outside of their sweating that they need increased energy capacity to achieve.

Yes. 100%. Yeah. Detox is liver and kidney focused always. Sweat is a nice way to help, but as you said, is the mobilization that really matters. It's like opening everything up.

Put some heat on your face, open up those. That's what you're doing to yourselves. You're opening up your cells to release. to release toxins into your bloodstream so that your body can get rid of them.

But if you don't have the right fuel or energy to get of him, you're going to feel like poo. Yeah, most of those cells don t have direct access to your skin or your lymphatics in order to sweat it out.

Most of the cells are more centrally located and you have to give it by way of lymphatic to the blood stream to liver. And so it's still a liver kidney process.

Indeed, and so what I always talk about with my patients is that what Methylene Blue can do, it's not going to solve the problems. It's going solve your need to change your diet and your lifestyle, get on optimized levels of supplementation.

What it is going do is help support you now so that over the long term, its easier to get there. Its easier think about taking that walk around the block if you have a little bit more energy, a bit less pain, little less inflammation.

working on a relationship with your spouse that's stressful, if you have more energy capacity. This is something that I realized recently, Andrew, I think you'll find this interesting and Amanda too, is that your brain is obviously really heavy energy demand.

It's very, very difficult to think in nuance in gray area if you don't have enough energy. This is why black and white thinking is so common and so easy for people is because it takes less energy to thing about things either in one way or the other way.

If you want to live in nuanced, you have to have more energy be able to do that. More energy production capacity and that's what Methylene Blue can actually do and I've seen this where All of a sudden, there's like, oh, it's not just I'm going to do nothing or I am going run a marathon.

It's, like no, I can take a walk around the block and that's going be okay, right? Or I could start changing my diet just a little bit or work on my stress a bit more than I would have otherwise just because now I have a lot more capacity, more reserve because the mitochondria are more supported.

What I love about you describing that is that that really the essence of us becoming the deep humanity that we want, right? We don't really want to be frogs or lizards where either we're safe or unsafe.

It's not this reptile brain. We want live in those gray areas where we can feel deep emotions and experience things and say, yeah, I can see all the difference.

That's why everything from watching a drama on some movie to having a conversation with someone, it's about all of that nuance. And really that's the beauty of life, right?

And so to tie that back to what you just said, that that is why we need to live healthy and find these magic bullets is because that the sweetness of the life.

Right? That nuance. So I love that. I loved that you describe it that way. And the reality of that significant. And we do see so many patients who are in this sympathetic dominance where they're wired and tired and they are exhausted and anxious and super inflamed.

And I know that there is a nervous system angle to this too. I've been doing a lot of research on parasympathetic, the sympathetic system. We've got another podcast coming up on the vagus nerve soon.

So I've been diving deep into that. How does mitochondria inefficiency drive that pattern? And where does methylene blue fit into the sympathetic dominance, tired, anxious people?

## Sympathetic Dominance and Nervous System Support

Because we see so many of them. Yeah, I love that question. And it's a really important one, right? Because what can happen here is you get this sort of spiral that can happened, whereas mitochondria are trying to make energy, but they can't for whatever reason, because they're getting bogged down in the process and they go into this.

the cell danger response, which is where they stop making energy effectively. They're trying to protect themselves. And when this happens, it's very difficult for the sympathetic nervous system because oftentimes you're already sympathetic overdrive.

You're on the you're not getting enough energy. And so the system is trying to make more energy, but you can't because the mitochondria aren't able to do it.

So when you are in sympathetic dominance, you re putting out a lot of epinephrine and norepinephrin in your neurotransmitters. You're putting in a lots of cortisol as well.

This is try to help you make energy but what happens over time, as I mentioned, the mitocondria stop working as effectively and so you have this mitochondrial dysfunction that's sort of compounding the sympathetic activation, right?

Because Think about it this way, right? Sympathetic activation, sympathetic overdrive, let's call it, or whatever you want to say, there could be different reasons for this.

There are sort of external reasons why we're stressed on a regular basis. We have stressful jobs, we have six children and not just four like me. You have a stressful relationships because you have 6 children, and now four are like We have stressful environments and everything else and a lot of things that we have to do on a regular basis that can stress us out, right?

We also take it even further back. Do we trauma from our childhood or do we severe things have happened when we were younger that caused us to not feel safe, so these are external things.

That are causing sympathetic overload and of course society rewards these things, the hustle. I mean, I grew up in New York, the hustle is real. I had shorts in medical school, Andrew that said sleep is for quitters, right?

And so you sleep when you're dead. Exactly. Right. And society rewards all that. So that's happening, but then you have all these mitochondrial stresses directly that are causing the stress And so you get sort of this one, two, I call it like a top down, bottom up, like conglomeration of terribleness, because then you have this, what I called the sympathetic spiral of doom, actually, which is the synthetic spiral that you had the, sympathetic activation, mitochondrial dysfunction.

And it's very, very difficult to break this. because symptoms can be subtle at first, but then they can get pretty significant, like the tired but wired, the pain that never goes away, feeling like you never recover from anything anymore.

The feeling, your mood is never the same. You're up and down all the time. Do you have those small little injuries that you keep getting at the gym and you don't know why?

You can never heal from them or recover And they just compile and compile, right? And so what I found was very, very interesting to kind of go back to your question, Amanda, is that I had this guy just a couple of weeks ago, a practitioner.

He's like, Scott, I took your methylene blue and my anxiety went away. And I was like, hmm, tell me about that. He's like I've had anxiety my entire adult life.

I took your methylene blue and then my anxiety went away. Well, why is that right? We suddenly and very effectively supported in his mitochondria in a way that they were able to calm down.

They were able to relax and as a result of they were to make energy more effectively and then that sympathetic loop was starting to get less challenging for him.

And so I wouldn't give somebody methylene blue for anxiety per se, but in that sympathetic dominance side of things, you have to focus on mitochondria.

You have because if you don't and you just downregulate somebody's nervous system, they may get really, really sick or bad or feel bad along the way. And I had another lady just reached out to me, like with mold and Lyme and,

you know, toxicity and center, in that sympathetic loop, she's like, my doctor gave me something to decrease my nervous system, to reduce my stress, and it made me crash, right?

And that's something we see a lot if you're not supporting mitochondria. This is where, I've just found Methylene Blue to be like transformative to my clinical practice.

I think fundamentally you're touching on the mistake that we've been making maybe forever but I have a symptom, what thing treats that symptom? Right?

We're not a collection of symptoms, right? And we're destined to get a particular system. It's not in our genes that I'm going to anxiety. it's a very elegant complex interaction of all of these cells that are going on.

As we treat the foundational things that make the system work, then totally unexpected symptoms can resolve as opposed to, oh, here take this because, you know, 10 other people had it help their anxiety, right?

I think that there is a real revolution happening in medicine right now, of looking for how it actually works. And this is not a knock on our, the people whose shoulders we're standing on as physicians, because I don't think that we did not have as much scientific knowledge to be able to put all the pieces together at the point where they were practicing, right?

As we understand how these systems work better and better, now we can work backwards and we It's just a beautiful thing to me. So I love that you could give that example of a practitioner who said, Methylene Blue made my anxiety go away.

What we would think of is, oh, be cautious because you can get serotonin syndrome, right? As opposed to what is this doing? How does this work in the body and therefore what things could we potentially hope to see happen?

I will say about serotonin syndrome that that's not an issue. Let's be clear there. So, methylene blue does increase seratonin, norepinephrine at higher doses, it does increased dopamine, but there's never been any studies that showed that oral methylenine blue can cause a reaction or an interaction with an SSRI or another serotinidic drug that would cause seretonin syndromes.

That's the mindset we've been in is, oh, look, it caused this in this one study and therefore that's what it's going to do. And you're like, no, that is not physiology.

That is certainly not biochemistry. Absolutely not. Yeah. The other thing I think is interesting here as a couple of points that I might be helpful is that we know most mental health disorders are not primarily biochemical.

They're primarily mitochondrial. Their primarily cellular in nature. And this is why you can use something like methylene blue and see patients' depression or anxiety go away.

Or you could change their diet and put them on a ketogenic diet. There's a whole organization that does this. I'm sure you've heard. and having people with bipolar disease and schizophrenia have completely resolved or almost resolved symptoms purely by just changing their diet to be on a ketogenic diet instead, right?

This is all because you're making the mitochondria more efficient by using ketones instead of carbohydrates or glucose for fuel, and we know this is the case.

And so, it's very important and I 100% agree with you because The way I think about this, and I'm sure it sounds similar for you, Andrew, probably Amanda as well, is like, if you focus on the basic foundations of how a cell works, how the mitochondria work, what are the inputs there, the outputs, looking at it from a physiologic perspective, then the scale at how that scales is exponential.

Because if work on that basic stuff, in quotes, basic, and then that's optimized, then everything above that is going to get better too, because that the foundation of everything.

It's like the seed, a fractal, it's that tiny thing that grows a baby. For example, we were talking about earlier, if you have optimized mitochondria, that how you make the best form of anatomy.

That's how it goes. I think it's so important. And I don't think methylene blue is something that's the only thing people need. I tell people that all the time.

So I talk about it a lot. They think, well, that is all you need, Scott, is methylenine blue. No, of course not. This is someone that can be utilized in targeted ways and effective ways across the spectrum of health.

We've talked about for significant mitochondrial dysfunction, but all of us have mitochondria dysfunction sometimes. If you're on an airplane, you are hypoxic on airplane.

You're low oxygen, for example. Your pressurized to about 8,000 feet above sea level. That's low-oxygen for maybe not you and I, Andrew, but I know for Amanda for sure.

So I'm at 5,500 here. Whenever I get off an aeroplane and sleep in a hotel, my aurora loves me because I am now at 21% oxygen. But on a airplane for most people, you're at 17 or 18% oxygen compared to 21% at sea level, that's an immediate hypoxic stress.

So you get less energy capacity, more reactive oxygen species, and more inflammation. And one of the main reasons why people get sick and don't feel good when they travel.

But you add a little bit of methylene blue to that. They all think it's because the person next to them coughed and you didn't have oxygen. It's kind of a big deal.

That mask is actually probably going to make it worse, not better. Exactly. We'll get even less oxygen. I know, right? I mean, especially those bad news like the N55 and 95. Sorry, I hope it didn't give anybody any trauma from that.

But if you're using methylene blue on an airplane, you are compensating for that low oxygen stress because methylenine blue can act just like oxygen actually and become the final electron acceptor in the mitochondria, just as oxygen would.

It also mops up free radicals and decreases inflammation as well. very nice travel hack, you know, for people that are traveling to prevent you from feeling like crap when you get to your destination.

Maybe I love what you just said more than other people because of a little bit of background in biochemistry, right? You have to take it to become a physician.

But the final electron acceptor, people think of oxygen and they're like, oh, we have it. Well, have an electron exceptor is what we need to have. Exactly.

It just happens to be one of the very best at doing that. But it's not the only one that can do that. And if people can understand that, then they could say, wait a minute, I could substitute something else for oxygen?

Yeah, that's exactly what we're doing here. Yeah. I have a good story here for you. So mind-boggling to people to think, oh, Wait a moment. Methylene blue is like oxygen.

It did the job of oxygen though. So a good example here for you is, have you guys heard of the Leadville 100 before? It's an ultra-marathon, 100 miles.

I worked with a guy last year. He had finished a race the year before. It didn't do well as he wanted to. But we gave him this past year, 32 milligrams of methylene blue every four hours.

And he cut three hours off of his time from the year before. Because it increases his aerobic capacity, right? It can

maintain his capacity to stay at a higher heart rate for longer without having to stop, and that's really what I've seen across the board.

I had a lady, one of my patients, this is like three or four years ago, she's a Southern lady. She had great Southern accent, which I'm not going to try to do on this podcast.

She's like, Dr. Scott, I can't do it. When I, so when I get on my treadmill, she refused to not work out with it because she realized that you could keep her heart rate up for longer if she had methylene blue on board before she has to stop.

And so that's what I think is so cool. It's that it's one of those compounds where you can use it in the sickest of sick people, you know, chronic Lyme, and chronic mold, long COVID, fibromyalgia, a whole thing, right?

And it is not, treating the disease, it focused on that mitochondrial side of things that we've been describing here. Exactly. I think that's I love that you say that.

And it's so important, again, for our listeners at home to hear that of this is not the cure. This is a support. As we do all the things you have to do, you still have To eat right, You still Have to, get rid of the mold toxin or you Still need to treat the Epstein bar, the lime or whatever.

Right. But if you do this alongside those things, it will make everything work better because now you have energy. Well, if you don't have low enough energy, you're dead.

## Performance, Dosing, and Practical Use

So this is sort of the opposite of dead we want that right I think for the most part to be a great second I think we all could agree. But what's also interesting, too, though, is that you can use it as an antimicrobial at the same time.

And so higher doses of methylene blue, I've used, you know, for some of these chronic co-infections and chronic infections. The key with this is if you're using higher dose of the methylen blue and you are on the sicker side of this spectrum, then you need more antioxidant, more binder support, and more additional things to help.

move it over without feeling like you're getting too many detoxification symptoms. I didn't ask you this ahead of time, so hopefully I'm not putting you on the spot with this question.

Why do you think it has – or one, do think you has and second, why such meaningful effect with Bardenella in the Lyme community? You know, we're like, yeah, it treats Bardinella well.

it's going to be antimicrobial for everything but why is it specifically thought of for Bartonella? Specifically and I do know the answer to this is because of the biofilms.

So Bartinella is well known to create pathogenic biofilm in the gut and other locations and Methylene is a fantastic bio-film buster, destroyer because that hydrogen peroxide that it produces.

It also has a very other and another very interesting quality here to a lot of the patients that have these chronic medical issues or chronic complex infections.

When you do, you often have a of blood pressure problems like your blood pressures low. This is like the pots kinds of scenarios where Yeah. Positional hypotension or a positional orthostatic tachycardia syndrome, your blood pressure is low.

Your heart rate is high. This is something because oftentimes you have a lot of what's called inducible nitric oxide in circulation. So nitrous oxide is supposed to be healthy for you.

I mean, it is in your mitochondria. It is your brain. But if it's circulating around, It drops your pressure. it causes

inflammatory pathways to get dysregulated.

You have lot a pain. you'll have lots of inflammation and your Blood pressure sucks. Okay. And what Methylene Blue does at low doses, is it binds up this inducible nitric oxide and prevents it from forming.

Well, it prevents inducible nitroxide synthase from making nitrous oxide is the long story. And so all I mean by that is that all of a sudden you have less nitrile oxide in circulation, so your blood pressure gets better, your pain gets, better your inflammation gets.

So the cool thing about using methylene blue as an antimicrobial is you're also getting these benefits too. You're getting the mitochondrial benefits.

at the same time. It's like, it's what I often do is to slowly increase the dose. Like that's, what's important because if you go too high too quickly, It may be hard because you might get like some of that detoxification kinds of stuff.

But if it goes slowly with those, you get the mitochondrial support, if the nitric oxide down regulation, that set that in the circulating nitrous oxide, and then you Get the antimicrobial like that.

So very powerful combination along with those biofilms too. So do you speak to dosing a little bit more specifically? Would you start at 5 mg? I mean where would you recommend people start that are fragile?

It depends on the person, but if they're super fragile, somewhere around four to eight milligrams is where I typically start. We have a product called Just Blue at Triscriptions, which is 16 milligrams.

And so that's our consumer strength. You can take a quarter of that. It's developed in a buckle trochee, a dissolvable lozenge that can either be dissolved in the mouth or swallowed.

Typically, people were going to swallow it because nothing in their mouth is going be, well, very, blue. However, I would say at low doses, like I have a colleague of mine, Andrew, her name's Ashley.

She's in California, Bartonella story. So anytime her Bartonella acts up, she uses four milligrams or eight milligrams of Methylene Blue in her mouth.

And her brain fog goes away in about five to 10 minutes. It's faster in the mouth, but you can swallow it too, of course. Most people are going to do that.

But I usually start off at four to eight kilograms for somebody super sensitive. And then I increased their dose by about four milligrams every three to five days, knowing that up until about 25 milligrams of methylene blue, that's a really good mitochondrial support.

It still supports some mitochondria at higher doses, but then it becomes more anti-infective around a milligram per kilogram, which is going to be about 50 to 70 milligrams.

Ideal body weight too, by the way, ideal body weights. So not somebody that's 300 pounds, that five-four, like, you know, not ideal weight, right? And so, no offense, I don't want to shame anybody.

You get the idea, right? And so the important thing is that the higher dose is going to be more anti-infective, but as long as you go one slowly, typically it's very well tolerated.

If you'd go too fast, sometimes it can be, you get detox, hurtsing kinds of symptoms. I'm sure you can use glutathione and you use binders and your sauna and rectal ozone.

It can go a little crazy, whatever you want do, that's going help. That's why I always go slowly. Unless it's more of an acute issue, where it is like an acute infection, then like acute viral infection bacterial things like that, I'll use up to two milligrams per kilogram, about 150 milligrams for about three to five days.

Sometimes on its own, sometimes in combination with other prescribed antimicrobials and things. Okay. Here's a question that's probably going to have a short answer.

Is there any safety recommendations for methylene blue in pregnancy? The answer is no. Yeah. I mean, although the research is pretty – the only research that shows it's detrimental is when it is used as a tracer in amniocentesis in the third trimester.

But because of that, you're not allowed to use methadone in pregnancy. So there you go. Now I'm interested. in the fertility aspect of this, where could you use Methylene-Boo to help support mitochondrial function, help people, you know, women get pregnant?

We see so many people with hormone imbalances. And you would think that it would be actually quite helpful during pregnancy, but there's no studies to support that nor could we do it.

Right, exactly. So I asked that, yeah. If your ovaries have such a high concentration of mitochondria, if your sperm has such concentration of mitochondria, it makes logical sense to me that if you support the mitochondrion, your ovaries are going to function better, you're sperm's going function a little better.

It's gonna help in some shape, form, capacity. it might not be the answer for everybody, but it's certainly gonna to help. I have a question too. So, back to your southern charm earlier, when she was like, I'm gonna, have to take it before I get on the treadmill.

Are there sit do you take for people who maybe like me a little bit on the biohacker side? I have a lot of supplements in my cabinet and i'm not a very compliant Take the same thing every day type of person like to mix and match my stuff really keep my body guessing If i'M one of those people or maybe I take it consistently there's a few things but How should somebody be taking this if they're not?

dealing with Lyme or complex illness. Maybe they're not fragile, but they are listening to this. They're like, hey, I want to hop on this train. I wanna work out a little bit better.

a reel from this biohacker who I think he was taking your transcriptions and he, was like, the first week, like I was just kind of like and then I started taking it and by week four, I'm on fire at work and my brain is open.

And he's just, watching him I want that energy. I am talking to him tomorrow. This is great. So if you're pretty well optimized, the way you think about using Methylene Blue is for performance, right?

And that means long day at work, travel, endurance, those kinds of things. I often say this, some people need Methylene Blue a lot of the time, especially in the beginning of their journey and their bridging.

And other people do some dusting, methane blue, some of the time when they're doing additional stress, that's going to cause mitochondrial stress that might benefit from a little bit of extra help.

And so the biohackers and the performers out there, usually you're using it maybe two or three days a week max and using at a dose that works for them.

So I usually recommend the same titration where they start off at lower dose. My main dose for most people is actually 12 and a half milligrams. So we have a product called Troplus Blue for practitioners only at transcriptions.

And a quarter of that is 12.5 milligrams, so that's what I typically use. That's like a good mitochondrial dose. For most, people start off at 12-and-a-half to see how you feel.

go up to 25 if you need to, if don't feel it, but usually between 12 and a half and 25 milligrams is a good dose for most people on the performance side of things.

And what they'll notice is what we talked about before, better endurance, energy, focus, less brain fog. It may not

be, it's not like Adderall. Not like hitting you over the head with a stimulant or something like that.

More like you feel elevated and you just go. Sometimes it can be subtle where You look back at the day and you're like, oh, wait, I didn't get as tired throughout the, like my fifth kid came in and didn' make me want to yell at them when they started talking, right?

My fourth for me, Right? Yeah. But you know, you get what I mean. So like sometimes it could be subtle, but like you feel it in a non-stimulated way. It's not like your caffeine crashes and up and down.

it's all like taking a lot of stimulants and things. And it is really kind of like up, and go and get that sustainable energy for longer. I had that exact experience when I started taking Methylene Blue.

I was taking 6.25, then I took 12.5, and then 25. The reality was 12 and a half, I felt just fine. And what would happen is after I would take it for maybe two weeks, Then I didn't notice that it was really that important anymore.

So I drift off of it and then I'd take it again, right? Like it just feels like, yeah, I can definitely feel the difference until I don't feel like I need it anymore, which doesn't take that long, 10 or 12 days.

And so I guess I would just say what you've described is exactly what I've experienced and it makes perfect sense that if everything is working fairly well, you don t need every day.

And I don't actually, I dunno what your opinion is, but I think you're better off taking it when you need it. Right. Unless you are coming from a place where you needed as a bridge, like as bridge.

Yeah. If you feel ill, you should be taking. Exactly. Going through a detox, if you going through huge stressful period, that's just emotionally, physically draining.

You know, I've got some triathlete friends, like if you're doing some like heavy, heavy training, you are putting a lot of stress on your body. If you have Lyme… But I would say to those people, the trainer, they're the athlete, that's the beauty of the R-Ring is that they still need to pay attention to their body, You can't take it and do too much.

That's not going to work. You're going do yourself harm. That is why you need to have something that says, yep, you're overtraining at this point. And I don't think it's going give you permission to overtrain indefinitely.

I'm not saying you can now be optimal, but there's an upper limit to optimal. not going to be bulletproof and you're not gonna be able to jump over buildings.

We're no Superman. Come on. Yeah, I mean, maybe soon. Maybe we can infuse the methylene blue with something to optimize your jumping capacity. But my main worry at this point is the opposite.

If you're watching, I guess all I'm saying is that taking every single day for the person who wants to be optimally healthy. I don't know that it's necessarily better for them.

know, 25 milligrams a day, seven days a week for a couple months until I can start coming down on their dosing. But with everybody, what I'm trying to do over time is get them down to a base level that they can use as needed more intuitively when they know they're going to have a challenging day or they woke up after having a shitty night of sleep and they needed the extra support the next day.

And then the main thing just in addition to this is making sure you're getting good quality stuff because I do worry about a lot of the methane blue on the market.

A lot it is contaminated with heavy metals like lead, mercury, cadmium and arsenic. If you're buying an Amazon, you don't know where it's coming from.

I had somebody recently tell me they bought it from a source that was US made that took three weeks to get

through customs, that kind of thing. And so at our company, we've- We all heard that, right?

Yeah. No, it was crazy. Three weeks, to-get-through-customs, US-made, when we launched the company in 2020, about six years ago this month actually in February, 2000, whenever we are 26. Now six years later, it took us a year longer to release our first product because it takes us that long to find a good source of methylene blue.

It's not easy and it could be contaminated along the way. And we're like, we do a lot of different testing on it. So when it comes in the United States from our manufacturers in Japan and Korea, We test it all again, even though it becomes a certificate of analysis and says it's good.

We've even had to throw out thousands of dollars worth of that stuff over the years too. And no companies are doing this, right? No companies rechecking their certificates of analysis from other places that are coming from around the world.

Very, very rare, especially in the Methylene Blue world, but it's sort of an issue across the supplement world as you guys know, is that supplement companies, are not regulated unless they're self-regulating.

And so as a physician, as Dr. Ted, my co-founder with Boomer, we're both physicians, So, we wanted to make sure that everything that came in was tested again in an independent lab and then we would make our products with it.

And only then, would we put it in our product and test it again before we sent it out for mass consumption kind of deal.

## Quality, Safety, and Final Takeaways

So it's one of those things where you have to be really careful on quality. I don't want my patients to get high levels of cadmium and arsenic and all those natural compounds that you were talking about before.

They're not very good for us. Natural but unhealthy compounds. We're trying to keep our synthetic compound free of those dangerous – Free of the terrible natural things, yes.

Yeah. No. It's so important because like you say, it's unregulated unless you do it yourself and yet this is how we can become healthy is no longer relying on pharmaceuticals alone but saying, let's pay attention to what we put in our body, right?

I'm not going to eat food that I believe is contaminated. It's funny when organic foods were first a thing. I was like, well, it's all organic. it just got carbon in it, what does that mean?

But now, I would not eat something spread with Roundup. right? Why would I take a methylene blue product that is, you know, adulterated with lead or cadmium?

I think it's irresponsible. And the idea that you can get these things on Amazon and trust what you're getting is I And there's multiple brands of things.

Like I don't think that there is only one brand of supplement that's okay. But it's a fairly short list of companies that really made this the hallmark of why they exist.

And so I think the fact that you guys did this for Methylene Blue is really important and should be appreciated by anyone understanding this particular area of the market.

Great. Thank you, sir. Yeah, it's really important to kind of talk about quality at the end here just because I know people, when we first started the company, we were the only company.

We were first company that had a commercial product. Now there's over 100 companies that have nothing but containing products. And, you know, were vilified initially in 2020. by major news organizations and other same

companies in 2025 had affiliate deals with Amazon companies selling methylene blue.

So it's kind of funny how things come full circle, but we're the tried and true and we've been doing this a long time. I really feel like from a clinical perspective, we've learned a lot over the last six years.

We had to dial in the dosing, really had understand how to choose patients correctly and how bridge them using it, knowing that it's not the end all be all.

It's something that really can be a great way to bridge and also maintain optimization in a more intuitive way over time. Yeah. Well, this has been great.

Just to recap, maybe for the listeners. This makes an enormous difference in our ability to make energy and it's an antimicrobial that is inherently much safer than your typical antibiotics because it's not going to destroy the gut bacteria.

So it really is when you said this at the beginning and I had never heard this that it was marketed as a magic bullet. Obviously it is not the whole story but it pretty impressive.

You built a great product. Thank you for that. Nope. the, how dark the urine is indicates oxidative stress. It's very individualized, but you'll find that certain people will find how fast their urine turns blue will be a sign at the dosing and also the time scale on how stressed and how much oxidated load is in the system.

So you find that. The faster it turns blue, the more oxidative stress? The opposite. the faster turns the blue the less typically. Unless it's a huge dose.

Because it is still there. Right. Exactly. So it oftentimes you have to get a certain dose level before your urine starts getting blue. You'll find that you'll need more to get that same blue if you're traveling, for example, or if your under more oxidative load.

Makes sense? And then so that's at least the idea behind it. Well, and it sounds like that is that once your urine is blue, you are getting enough. Exactly.

Right. And so this is what I've noticed. I was just pounding a bunch of methylene blue last week because everybody was sick and I coming down with stuff.

So I always taking 50 milligrams twice daily. The first day didn't be blue, which is very unusual at that kind of dosing for me. But the second day I going blue like, all right, good.

We're good and then it's one of those things where the system needs more and it is going to stick around for longer. because of that, right? When it cycles into its redox and when it's in its reduced form, it is not blue.

It's colorless actually. But I do have to run guys. I'm glad I need to get one of those children. That's interesting because what I found from my own energy is really all I did was I just took it – if my urine is blue, I am getting enough.

If it isn't blue I change my dose. Yeah. And symptomatically, so you are looking at symptoms in blue and like you can kind of correlate – not always but often.

Now let me ask you this again. Highest dose you have taken. The highest I've taken is 150. 150, okay. And I gave it to my mom a couple months ago because she got a bit by a tick.

Give it people with urinary tract infections. They do well at 150 and that's the highest. Awesome. All right. I'll let you go. Thank you so much. This has been great, guys.

Thanks for having me. It was so great having you on. Mitochondrial dysfunction is implicated in everything from

depression to metabolic disease to neurodegeneration to gut health to hormones to your ovaries to sperm to head to brain everything except for blood cells.

So There's a place, there's time for Methylene Blue. I know I'm going to go and try some very, very soon. Dr. Peterson, do you have any final thoughts, wisdom for our audience today?

No, I think that this was fantastic. really everything that he's talking about. I just was really impressed. Um, I don't think you can go wrong by using this product.

Well, you could do it wrong. But as long as you do a right, this will be beneficial. So, start your dosing low, go up slowly. Get a quality product if you're using it as an athlete.

Use it when you need it and don't use it. When you don' because using more will not necessarily be better, right? I think those are the take-home pearls.

Start low and go up slowly if you're fragile. And if your pee isn't blue, you'll need a little bit more, because you want your P blue. I want my green.

This has been great. Our listeners are really going to enjoy this. I do too. Don't forget to like, follow, and share. Tune in for next week's episode.

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