Introduction to GABA and the Guests

We often hear about dopamine, dopamine fasting, serotonin, epinephrine, norepinephrine, but GABA actually is the unsung hero because it actually calms down the firing of the brain.

Without the GABA system around, you cannot calm down the brain's firing. And GABA has this amazing interconnection with all these other neurotransmitter systems that I was just mentioning to actually regulate the flow of information and firing that's coming from some of those superstar neurotransmitters that I mentioned.

Welcome back to this episode of the Think Well, Age Well podcast. I'm your host, Dr. Heather Sandison. Today, I'm thrilled to welcome Dr. Scott Sher. He is a board certified internal medicine physician and one of the world's leading experts in health optimization and hyperbaric oxygen therapy.

He serves as the COO of Troscriptions, a company known for creating precision-dosed buccal trochees that focus on energy, stress resilience, and cognitive function.

He's the VP of Health Optimization Medicine and Practice, a nonprofit that trains practitioners to optimize health rather than just treat disease. He's also the chief medical officer at OneBase Health, which is a developing next generation integrative technologies that include hyperbaric oxygen chambers, sauna systems, and red light therapies.

I am so excited to dive into this conversation because as you can see, I've brought Dr. Scherer here to really dive into some of these cutting edge approaches to optimizing health.

Today, we're going to really get into a fascinating topic around the GABA system. This is the breaks of the brain, if you will, and we're going to talk about why so many people today are stuck in the sympathetic overdrive and how we can help to replete, rebalance this system, what that means for mental clarity specifically, resilience, and then, of course, healthy aging.

And I will start the conversation by sharing my personal experience. I met Dr. Cher at a conference at my naturopathic conferences last summer. And I was going through a particularly stressful period.

My clinic had flooded. Our clinic here in San Diego had gone through this horrible flood after a pipe burst. And I hadn't gotten a full night of sleep in weeks.

And the Friday before I went to the conference, I got the call that in fact, now there was a bunch of mold in the clinic. It was going to take even longer to.

get the mold out, resolve that. We have mold-sensitive patients and I was just sort of in a panic. And on Saturday, I met Dr. Scher and he showed me these trochies, something that you put between your gum and your cheek and let it dissolve and it could help me with my sleep.

that next morning, I was a little scared taking it that night. Like, what is this going to do? Am I going to be groggy the next day when I want to be present at the conference?

And lo and behold, I got a phenomenal night of sleep. I woke up feeling more rested than I had in, of course, several weeks. And it really has helped me get through a particularly stressful summer.

So in all of my emails, I signed off saying, thank you, Scott, for the great sleep. And I've also turned other patients onto this now. And that's why a big part of why I want Dr.

Sher to share here today is because I think this is an underutilized mechanism of delivering medicine. And so Dr. Sher, welcome and thank you for joining us.

It was my pleasure to be here, Heather. And I remember you very well at the booth actually, because I could tell you were having a bit of a challenging time.

It wasn't an easy conference for you to get to. I didn't know why at the time, but I remember you taking the product and then the next morning it was just like your nervous system had completely reset.

It was like, I haven't slept that well in such a long time. And I was like, perfect. And that's uncommon to get good sleep at a conference at all, because you're at a conference, you're under bad lighting all day.

You're going and checking out all the booths and all their products and you don't really know what you're taking by the end of the day.

Heather's Sleep Reset and GABA Basics

And so it can be very overstimulating. And so to see that kind of nervous system reset that I saw with you was, was a beautiful thing. And I was so grateful for it.

So let's break it down for those who aren't familiar. What happened was we turned on my GABA system. So I was able to rest and recover. So what is the GABA system and why do you refer to it as the breaks of the brain?

So the GABA system is really actually the unsung hero in the brain. We often hear about dopamine, dopamine fasting, serotonin, epinephrine, norepinephrine, but GABA actually is the unsung hero because it actually calms down the firing of the brain.

without the GABA system around, you cannot calm down the brain's firing. And GABA has this amazing interconnection with all these other neurotransmitter systems that I was just mentioning to actually regulate the flow of information and firing that's coming from the, some of those, you know, superstar neurotransmitters that I mentioned earlier, it's called an inter neuron.

Actually, it actually stays in between. these kinds of bigger neurons, sometimes the neuroepinephrine neurons, the dopamine neurons, it helps regulate the firing.

And it's also a sensory gate, which means that it helps gate information that's coming from the outside world so that we don't get overloaded. Now, if you go to room and you actually were trying to process all the information of what's happening in the room, the colors of the wallpaper, the floors, the smell, the sounds, this can be very overwhelming.

And the GABA system helps you regulate that information so you can actually process information and actually be able to filter out what you don't need so you actually can focus and do what you do need to do.

And so the problem though, Heather, and I think you know this is that there's so many of us now that are GABA deficient. Our GABA systems aren't working at the way that they're supposed to.

When you're GABA deficient, you have increased risk of anxiety, of depression, of insomnia, of tremors, of other medical illness as well. That GABA system is regulating all of that flow.

And a good example of this is your thought generator, your brain. Your brain on average makes about 70,000 thoughts per day. That's a lot of thoughts.

Doesn't mean every single thought there is unique. In fact, if you're anxious or depressed, many of those thoughts are going to be around the same thing as either being anxiety, having anxiety or having depression.

feeling depressed. And then if you're feeling anxious and depressed, that thought generator can go up to about 120,000 thoughts per day. And so what I always say in correspondence to this fun fact, if you want to call it that is that we shouldn't believe everything we think, right?

If you have 70,000 thoughts per day, that doesn't mean we should be thinking about all those thoughts and thinking that they're actually true. And And I have kids and we all often talk about this thought generator and how it can kind of go crazy on you and thinking about going down all these different rabbit holes.

Right. But you have a very difficult time, GABA system is dysregulated. And once you can get back, you get that GABA system back online, then you can start being able to regulate your thoughts better, or at least you're not generating 120,000 thoughts or generating like 70,000 thoughts.

And what's also really important is that we have another neurotransmitter in the brain that is also pretty unsung in the way that it's really, it's not only talked about a lot, it's called glutamate.

Glutamate is actually our primary excitatory neurotransmitter in the brain. It's not dopamine nor benephrine in those things. It's actually glutamate and glutamate gets converted into GABA in the brain.

And it requires vitamin B6 and magnesium to do this. And so if you don't have enough GABA, but you have enough, you have a lot of glutamate instead, you're going to get these sort of glutamate toxicity kind of symptoms, which is this overstimulation that I've been just describing.

And so as clinicians, many of us aren't thinking about GABA deficiency. When somebody comes in the office, if they come with anxiety, they come with depression, you were thinking about maybe other kinds of things.

If you're a conventional doc, you know, you're thinking about putting them on, you know, anti-anxiety medication, maybe, which actually is GABAergic, interestingly enough, although doctors don't really understand why they're doing that.

And then we're conventional docs at least. And then you have people that are depressed that come in and get SSRIs, right? And we now know from multiple meta-analyses that depression is not a serotonin deficiency.

When I was in training, that's what I learned. I learned that people with depression had lower serotonin levels, but actually that's not true. It's actually the same amount of serotonin in somebody that's depressed versus not depressed.

But there are actually very good studies showing that depression is actually associated with low GABA levels as well. And so actually the newest drug on the market for depression, actually for postpartum depression, is a GABAergic drug that works directly in the GABA system.

It doesn't take four or eight weeks to work. It works immediately. High level for those that are listening is that GABA is the brakes of our brain. And if we're GABA deficient, we can't put those brakes on.

And then we can get stuck in this sort of spiral where we're in this over activation, this sympathetic overdrive, that fight or flight nervous system that just can't shut off.

And I think people aren't maybe familiar with GABA from a medical perspective, but a lot of people have experienced these GABA-ergic substances, right?

Like alcohol. They have. And potentially benzodiazepines, the anxiolytic medications that they might have been prescribed. And those can be actually dangerous, right?

The only addictions that can kill us if we stop cold turkey are benzos and alcohol. You know, on this spectrum of GABA interventions, talk us through where, like the trust prescriptions product that I took, where is this on this continuum?

Do we need to be concerned about addiction, about habituation? Sure. Talk us through that. It's a wonderful question. And it's a really important because most people love modulating the GABA system with things like alcohol and benzos and sleep drugs, because why they make you feel good or they make you go to bed.

The problem with alcohol, the benzos and the sleep drugs, but especially alcohol and the benzos is that they bind very tightly to the receptor, the GABA receptors.

When you send me buying something very tightly to the receptor. It's called an allosteric site. It's a separate site where alcohol binds or the benzos bind.

And that separate site where it increases the affinity for that GABA neurotransmitter to bind to the receptor. The problem with alcohol and benzos is it binds so tightly to the receptor and then it requires so much GABA to bind as a result of that, that it causes this.

feedback loop in the brain or in the receptor to actually try to modulate how many receptors are available so that it doesn't have that flood of GABA that's happening.

And then over time, you need more GABA. We need more benzodiazepines. You need more alcohol to get the same effect. And what's happening is you're getting more and more GABA deficient.

over time, you have less reserve. And so what happens is when you, if you stop those drugs, cold turkey, you get this rebound effect where you can't get enough GABA to bind.

And you have a huge amount of glutamate in correspondence, which is that primary excitatory neurotransmitter. And that's when you get these, what we call the withdrawals of alcohol and benzos that can be deadly and cause a hemodynamic instability.

So your blood pressure can go crazy. Your heart rate can go crazy. You can start getting what are called DTs, delirium tremens, where you actually get hallucinations.

And, you know, I've seen this, you know, countless, countless of times. And so you have to be really careful about how you modulate the GABA receptor.

And a good question that I always get asked is, well, can I take GABA itself? The problem is that GABA itself is too big of a molecule to get into the brain.

So if you take a GABA supplement. And it works for you. If it's a pure GABA supplement often means unfortunately that you have a blood brain barrier that is leaking things inside the brain that shouldn't get in there.

We call that having a leaky brain. Now it sounds scary and it, you know, it kind of is, but it usually is correlated with a leaky gut. And so if you optimize somebody's gut and make it so that the guts not, you know, leaky and inflamed, it typically will take care of the blood brain barrier at the same time.

And I've, I've had patients over the years where. they come in and they're actually GABA supplements are working for them. And then we optimize their gut function and the GABA supplements stop working.

And this is, you know, diagnostic for a, like a leaky blood brain barrier. So GABA supplements should not work for you. If you're taking a pure GABA supplement.

Now, the only maybe caveats to that would be if it's a very, very high dose of GABA of like two or three grams of GABA, some of that might get in just because of the sheer amount that you're taking.

And then there are some potential. Possibilities with that nato liposome was like a very small liposome would be able to get in through the blood brain barrier, as opposed to the regular gap of supplements.

But what, what I think about here, Heather is like, it's kind of like a two pronged approach, right? When you, when you have somebody that's GABA deficient, you want to be supporting the system, optimizing vitamins, minerals, nutrients, gut health, understanding why they might have a lot of stress or.

exposures that are causing stress, right? This could be a bad relationship. This could be even, you know, trauma when somebody was a child, for example, that, and they never feel safe and they've always been in fight or flight, you know, since, you know, whenever, right?

And so there's a lot of different reasons as to why, but the challenge with all this is like, I can, I can send people to therapists like we can do or to the jungle in Peru, whatever is required, but.

That takes a while to work.

Why GABA Deficiency Drives Anxiety and Overstimulation

And the question is, well, how can you really down-regulate that nervous system now and improve GABA levels? And so the way I think about this and the way we think about this at Transcriptions is that, well, we want to modulate the GABA system in the most comprehensively supportive way possible.

And so what we do there is think about, well, if you're going to give something that's going to bind to the GABA receptor, you better also give some GABA or something like GABA that's going to bind to where GABA would bind so that you don't deplete GABA in the process and cause a risk of tolerance and dependence and withdrawal if you stop it immediately.

And so there's a lot of great compounds that actually are very, that are natural that bind to these separate sites on the GABA molecule, GABA receptor, excuse me, that are not as that are not as dangerous as alcohol and benzodiazepines.

There's a couple of those that I like. One is called Kava, the Kava plant. Kava binds to a separate site. That's also very good. There's also some cannabinoids that are non-psychoactive like CBD, CBG, CBN, really all the non-psychoactive cannabinoids bind to separate sites on the GABA receptor.

They also bind to other receptors like the endocannabinoid system. They bind to the serotonin system as well, but they also bind on the GABA receptor.

And then you also have other compounds as well that I like. Things like Hanokial from Magnolia Bark is another one that I use. There's also Valerian, which binds to a separate site that's also used for sleep.

That's all good, right? But if you're a kava drinker, if I've never really had a lot of kava drinking in my personal experience, but I know kava drinkers, they will notice that over time they do need more to get the same effect.

And that's because even though it's not as tightly bound to the receptor as alcohol or benzos, it does deplete GABA over time. And so what we do at Transcriptions, we add something that goes indirectly through the blood-brain barrier, and then it binds to where GABA would bind on the receptor.

So for our COM product, it's our COMing product called TROCOM, we have something called nicotinol or vitamin B3 attached to a GABA. And that vitamin B3 has a transporter that gets across the blood brain barrier, takes GABA with it.

And then it breaks up or hydrolyzes into B3 and GABA. So the GABA goes to where GABA would be binding on the receptor, which is what we've been talking about.

And then interestingly enough, the B3 there, the vitamin B3 is actually mildly activating. So it's. turning into NAD in the brain. And that's good because you can get this anxiolytic effect, this relaxing of that anxiety effect, but you don't have the sedative effect that you would typically get from benzos or even alcohol if you have a little bit too

much of it.

Right. And so, and so that's how we kind of paired there. And then we have a sleep product called Trozik. that combines the Hanokyol, depending on how you like to say it, from Magnolia bark that binds to the separate site on the receptor, along with something called agarin.

And agarin binds directly to where GABA would bind on the receptor. Agarin is from a psychedelic mushroom called the Amanita muscaria mushroom or the fly agaric mushroom.

And it's the beautiful mushroom with a red cap and white spots. People have seen this, if you've actually watched Alice in Wonderland or Mario brothers, or if you like Christmas, which many people do, there's tons of mushrooms around Christmas.

And there's actually a lot of lore around these mushrooms as being part of the Christmas mythology. Actually, it's, and if anybody's interested, go to New York times and type in Amanita Christmas.

And you might be shocked actually, because this mushroom. It has a, it's a psychedelic mushroom, not like, not like a psychedelic mushroom like psilocybin.

It's a little bit different than that. It doesn't give you like hugely visual experiences. Typically it has another ingredient in the mushroom called Ibotenic acid, which is neurotoxic.

And so that was typically gives them more visual experience, but the agarins more of a long acting on that GABA receptor. So the way we think about. that sleep product is that you're combining those two things together so that if you're enhancing the amount of GABA to bind and you're not depleting GABA at the same time, these are giving something that can work just like GABA on the receptor.

And I want to be clear to our listeners that you're not suggesting taking a psychedelic with the trochies here. No, no, no. There's a compound that supports sleep that's in there that happens to come from a psychedelic mushroom.

Right. It's not psychedelic at low doses either. Not at all psychedelic. Okay. No, no, no, no, no. It just has an interesting origin, but the compound itself is not psychedelic and is very safe at low doses.

And so we combined these two pieces together. We call it an obligate pair, which is a fancy way of saying that pairing two compounds together that are really comprehensively supporting the GABA system.

And by doing that, you can get fantastic anxiolytic or sleep support without having any risk of potential dependence, tolerance, or withdrawal over the longterm.

So the delivery is also really unique here in that it's this trochee, right? It's a small amount that you put, it's not in a capsule, and you put it between your gum and your cheek.

And I want to talk through just the physiology there. But one of the reasons why I'm so drawn to this is because I, for one, don't love swallowing supplements.

And two, I have many patients who that becomes the bottleneck is they just don't want to swallow more pills. And particularly if it's more water before bed and they have struggles with their prostate or with getting up at night to urinate.

If you're struggling to fall asleep, having that in your bedside table and putting a trochee in is a really simple way you can do it without even turning on the light, right?

To get the benefits of this. And you have other non-sleep support trochees as well, but let's just talk through how the trochee itself works and why you chose this as the delivery mechanism.

The buccal turkey is fantastic. And it's a, the way we describe it is it's a dissolvable lozenge that goes between your upper cheek and gum. And what's nice about the delivery method being up here is that the, or between your upper cheek and gum is that you have about eight layers of mucosa up here.

And so we designed it so that it was a slow release formulation over about 15 to 30 minutes. up into that upper cheek. And what's, what's really great about this is area and then multiple things as a result of this is that you have fast acting.

So it doesn't have to go through digestion. It doesn't have to go to your stomach, your small intestine, your liver. It just goes directly into circulation, which is much faster.

It's also going to be more bioavailable, which means that the ingredients, when they get digested, go through your stomach, small intestine and liver, they get often less bioavailable.

They get less active. And so you prevent that from happening. And some of the studies are pretty significant, which are at least 20X more potent staying in the mouth compared to being swallowed.

I always give the example of something like NAC and acetylcysteine, which is only 10% bioavailable. If you take it as a supplement, if you take it orally and you take a hundred milligrams, you're only getting 10 milligrams in the body.

So we know that from our research that we've, we've chosen compounds that maintain their bioavailability in the mouth. They have to be water soluble was kind of the big thing.

And as long as they're water soluble, they can get through into the buccal mucosa and be much faster acting and more bioavailable. And then the nice thing additionally about the trochees is that they're scored.

So you have like a little line or a cross in the middle where you can actually take a quarter of it or a half, three quarters full, and you can really dial in your dosing.

And that's one of my big. You know, tiffs with, with capsules oftentimes is that if you have a, you have a very sensitive patient and it comes in a 240 milligram capsule and like, you know, that they're likely going to not do well at that dose because they don't ever do good, do well at the lower doses.

It's almost impossible to open up that capsule and try to figure out how much they take. And like, it's a. It's a thing, right? And so I've been, this is kind of my own personal experience over the years.

I'm always like the sensitive one. You know, we were talking about nicotine patches before we got online and we'll talk about this, I'm sure. But like, I tend to have a very low need for these kinds of things.

And so the trochee is really nice for that is you can titrate it to find the exact. dose that you need. And then that can also change, right? If you're traveling or if there's more stress, or if you just had a flood in your office or whatever, right?

There's a lot of different reasons why you might want to modulate that dose. Like if a quarter really works for you well most of the time, but then it's like, oh crap, I have something really stressful and maybe need like a half, right?

Or whatever it might be. So, and the way we developed the true comm specifically the one that's for relaxation and anxiety, anxiety reduction during the day is that you don't feel tired with this one.

So you can take a quarter or a half and you can actually just drop back down into like a cognitive capacity. That's significantly better than it was when you were too stressed.

And we all know that feeling of just having too much stress in the brain or too much stress overall and not being able to think as well. It's because we're not getting a blood flow to the brain to really get that executive function, that

cognitive processing back online.

But if you can just drop down the nervous system a little bit, it can go a long way to making you feel better. Well, let's talk about nicotine. I'm grateful you brought it up because I've had, I've read the research, you know, getting nicotine in can be helpful for cognition, kind of like caffeine, right?

GABA-Supportive Compounds and Troche Delivery

And the reason I found out about this was because I had patients coming into my office saying, hey, I'm using a nicotine patch or I'm using the nicotine gum and so is my partner.

and we feel more cognitively online when we use it. And so then they went into looking at the literature and starting to suggest it to other patients and other patients were going, what?

Is this my doctor telling me to smoke cigarette? No, no, no, no, no, not at all. So, but there is this great potential for nicotine to be supportive of cognition.

So talk us through that. Tell us what you understand about that and how you, how you deliver it with transcriptions. I mean, I'm a dear kid, but I grew up in the 1980s and we had all these buses that used to come to our schools to tell us not to drink, not to smoke, but especially not to smoke because smoking was terrible because of the nicotine in it.

So it was definitely a reprogramming on my side too, Heather, when I first learned about nicotine and how it was being used. not vaping or not smoking, but actually in gums and patches and others and seeing fantastic effects on cognition.

And it's like the baby with the bath water kind of thing. Right. And so most of us were up that nicotine was bad for you. It was the devil. It was going to addict you.

You were going to die of smoking related disorders and cancer and things like that. And I'm still very much. against smoking and vaping. And that's not necessarily for the nicotine.

It's actually related to how fast the nicotine gets in the body, which is very fast. And also the other things that are in nicotine containing tobacco products, which is usually additives that make it more addictive.

And then of course, there's also the dose of nicotine that you're getting when you vapor and smoke compared to being more modular, modulatory or you can modulate it easier with other types of delivery devices.

So again, short story is vaping and smoking. Please don't do it. Okay. And then the third thing there is the dose really does matter less than about four or five milligrams a day of nicotine, at least orally.

We don't know about patches, patches a little bit different, but oral taking nicotine. There's been no, evidence, there's any addictive capacity to that.

Okay. And so with patches, it's a little bit different because patches, you're getting a longer acting nicotine that's kind of on there for a period of time.

So it's very difficult to get addicted to something that's long acting and as a slow ramp up. Right. And so the beautiful thing about nicotine though, like, and we'll talk a little bit about more delivery in a minute.

These low doses have been well studied to improve cognition. And it does this in a number of different ways. The most well-known way, if there's any way that nicotine is known to improve cognition is that it binds to a receptor in the brain called the nicotinyl acetylcholine receptor.

Okay. And then this particular receptor, when it's bound with nicotine increases acetylcholine, dopamine, serotonin,

and norepinephrine. So these are all neurotransmitters that will help you cognitively feel better.

It'll help your working memory, help your verbal fluidity, help your recall and help your focus. And so this is all well-studied in normal kit, normal people, as well as people with myocognitive impairment with Alzheimer's.

Like there's. tons of good studies here. Okay. But what's an additionally interesting mechanism for the nicotine itself is actually it's profoundly anti-inflammatory in a couple of different ways.

It actually decreases the activity of a cell in the brain called the microglia. The microglia are a cell in our brain. They're like our immune system cells in our brain.

And when they're overactive, which happens in a lot of chronic complex illness, fibromyalgia, chronic fatigue, long COVID, like these, these microglia get overactive and they cause more inflammation.

And nicotine actually can depress or decrease the activity of the microglia, improving inflammatory cascades or decreasing them in the brain. And then it actually works.

So acetylcholine is actually the main neurotransmitter that is modulating what's called your vagus nerve. Your vagus nerve is the one nerve that comes out of your brain.

It's kind of your winding nerve that it gives you that what's called your parasympathetic relaxation tone. And so by modulating this particular neurotransmitter and the vagal nerve, what actually people will feel, which is really interesting, right?

Because we think of nicotine as a stimulant and it is on some level because it increases those neurotransmitters that I mentioned, but often people feel relaxed at the same time.

And that relaxation is because of vagal nerve relaxation. So it's like this parasympathetic response. And so it's a super, that's why people like it, right?

You get the stimulation, but you also get this calm feeling at the same time. And I like, I work with it myself in my own, my own sort of workflow, depending on the day.

And I do notice this, right? If you, if you get the dose right, you feel stimulated, but you don't feel relaxed at the same time. And the dose is important and the delivery is important.

And so you got your descriptions. We actually. The first product that we came out with was a combination with nicotine, caffeine, CBD and methylene blue together, because we were looking for a product that could use low dose nicotine and leverage its effects and then synergize with some other really great compounds as well.

And, you know, just for more context around this, I am trained as a naturopath and in naturopathic school, we learned lots about herbs, especially traditionally used herbs.

tobacco is among them, right? For millennia, Native Americans used tobacco, the tobacco plant, as medicine. This can be helpful for the lungs. It's sort of counterintuitive, right?

Because we think of smoking killing the lungs, causing lung cancer, which it absolutely does. So tobacco is a powerful medicine, has been used as medicine for a long time.

And now on the flip side, from the conventional perspective, there's a medication for Alzheimer's called galantamine. And galantamine uses not only the acetylcholinesterase inhibition, kind of like Aricept, but it also uses the nicotinic receptors.

And the neurologists who I work most closely with this, they recommend galantamine over the other medications used for dementia and Alzheimer's. So this use of nicotine to help support cognition and as a medicine is not only,

has not only been around for a very, very long time, but it's being used in modern medicine.

And through patches, it depends on the delivery system, but through patches, through trochees, you can get over the counter. This is available. You have access to nicotine to help to find the right dose for you and the right delivery mechanism for you to potentially support these systems.

And thank you so much for explaining. I didn't even know I'm learning so much. I didn't realize that it was affecting the vagal nerve and helping with some of that parasympathetic tone.

So I think something that has been you and me both had to relearn that nicotine is not the enemy. That's not the problem. It's really smoking. It's the lung damage, the other things, the chemicals that are in there.

Now, there can be a habituation, and I like to tell patients, this is just like caffeine, right? Like, if you have a cup of coffee every day, you don't notice the effects.

If you take a week off, sometimes you get a headache, maybe you get irritable, and then when you get back to that coffee, it is like magic again, right?

Nicotine can be like that. And for someone who's struggling with cognitive impairment or if you are giving this to someone with more moderate or severe dementia, make sure that you're consistent.

Because if you end up without patches, if you run out and they don't get it for a day or two or three, there can be some irritability. There could be some headaches.

They could have some of that withdrawal symptoms. So do you have any other thoughts to add around that? Yeah, that's interesting because I don't see it with the blue canadine.

I don't see it with the nicotine in the, in the trochee causing habituation or causing any need for increased dose over time. Interestingly enough, I think probably the reason for that is that we're using it more in synergy with other compounds as well.

And using super low doses in a blue can of teen, it's a milligram of nicotine and a full troche. And the average dose is a half of a troche, which would be at just 0.5 milligrams.

And most people aren't using that more than once or twice a day because they get three to five hours of focus, a flow of productivity. And that typically does the trick.

And then sometimes what people will do in the afternoons, if they don't want the stimulation is use one of our other products called just blue, which is pure methylene blue without any nicotine or caffeine in it, which nothing, but doesn't give you a stimulant capacity, but it does increase your overall energy and make you feel like you can continue to go without being overstimulated.

I have seen some habituation with the patches over time. And I think that, I think it's just because again, even though you're not getting that quick rise of it, where it doesn't give you that addictive capacity, your system, just like caffeine, as you mentioned, is going to potentially downregulate the receptors a little bit.

So you get a little bit of that habituation with the patches. What's really good, I guess, in general about nicotine withdrawal. These physical withdrawal doesn't last more than a day or two.

Typically, if you stop it, if you are doing, using a lot of it, even if using a ton of it, even if using, even if you're vaping a crap ton of it every day, the physical addiction doesn't last more than a couple of days typically.

But the psychological addiction of course could be very different because of how nicotine is affecting the brain in other ways. So I think it's important to.

divorce the concepts of physical versus psychological addiction in a lot of ways, but certainly with nicotine patches or other low doses of nicotine that there's going to be, there might be some habituation, but it's not going to be like a, like a cognitive addiction.

It's going to be more like a physical symptomatology that you might find if you stop it abruptly, at least with the patches I've seen that or, or high doses of a, of nicotine in pouches or, or other, or even like the sprays, for example, like that'll also potentially do it.

But I haven't seen it with the trokies, interestingly enough. I haven't seen people, and I think it's because we're using such low doses of it in synergy with other compounds as well.

And then the other nicotine form, delivery form, I want to be really clear. We are not endorsing is the dip? Dip or tobacco. Yeah, associated with mouth cancer.

So the trokies and dip are very different. Can you just break that down how those are different? Yeah. So dip is going to have a ton of other products in it.

It's not pure nicotine. And it's also going to have a lot of nicotine in it. Um, it's not going to be like a milligram or two. It's going to be like 15 to 25 milligrams of nicotine in a dip, not in a full container.

Like in the one thing you put in your mouth and, and put in, I remember when I was a kid getting so sick because somebody gave me some dip to try and I put it in my mouth.

I thought I was going to die. I felt, I was like, it was just, it was terrible. And that that's because it was just so much nicotine. all at the same time, right?

And it's very, there's a lot of nicotine, a lot of other products on there too. So the dose matters. There's a lot of nicotine products on the market now that are, that are not even tobacco supposedly, but they're like, they're higher doses of nicotine.

So you have to be like nicotine pouches. You have to be super careful. There's usually like 10, 20 milligrams of nicotine at a time. And that's a huge amount of nicotine that, you know, it can be, you know, very much habituated over time and, and much more addicting because of how much nicotine.

that you're getting at any one period of time of taking it. Okay, you mentioned methylene blue. And this is a really interesting substance, again, one that's been used for a long time in medicine.

So take us through how you kind of see that, what the utility of methylene blue is.

Nicotine for Cognition and Focus

Methylene blue, as you mentioned, has been around a long, long time. And it's really one of those things where over the last several decades, we know it's, it's fantastic as something that can support mitochondrial function.

And before that, it was known as an anti-infective antiseptic. It was used really the only antimicrobial round from about 1879. So 1879, not 1979, 1879 until about the 19… Then it became less used in that capacity because we had penicillin and other drugs that were developed in the forties and became more mass produced in the fifties.

Still used in fish tank cleaner as an antiseptic. It actually kills fungal infections. It's a fantastic anti-microbial at higher doses. But where a lot of the interest has been over the last couple of decades is in the mitochondrial side of what methylene blue can do.

Concentrates in the mitochondria and can compensate for mitochondrial dysfunction, either on the energy production side of things or on the detox side.

And so. I think most people know that the mitochondria is part of the cell that make energy. And what we do is we eat, especially protein, actually not protein, fat and carbohydrates to mostly bring them into our cells, to actually take electrons off of our food and to bring them in the part of our, into our mitochondria, something called the electron transport chain and create a, a gradient of energy so we can make something called ATP, our energy currency.

And once we make ATP. That is kind of powers all of the cellular processes that we have. We make about 150 pounds of ATP every single day, but it doesn't stick around for long.

It's actually very, very short acting. And then it gets recycled and everything else. When we make energy, we don't just make energy. We also make. We call waste products of energy metabolism and waste products is a very loose term.

We make carbon dioxide, we make water. We also make these what are called reactive oxygen species or free radicals. And some of that is good. We need those free radicals to help signal our mitochondria to help us know how much to make and how much to not of energy, but too much can also be very detrimental, especially if you don't have enough antioxidants to neutralize those.

mitochondrial dysfunction is sort of a spectrum, but it could be energy production issues. It could be detoxification issues, but all told about 94% of us adults have some element of mitochondrial dysfunction, either on the energy production side or the detoxification side.

And the most common reason In, in least U S adults that we know of is insulin resistance. So if your insulin resistance, if your blood sugars are high, your cells are seeing too much glucose.

And if the cells are seeing too much glucose, they're trying to make energy and then trying to make too much energy. And the body can't tolerate that over time.

And then it causes a lot of stress and, and then it causes deterioration of mitochondrial function, et cetera, et cetera. And the other big one is kind of a big category of stress.

or sympathetic activation. If your body's always in a fight or flight or you're, you know, you're always in sort of that, that, that place where you're vigilant, you're always releasing neurotransmitters that are, that are trying to enhance the amount of mitochondrial energy output as well that can cause dysfunction too.

And so that's like what I call the sympathetic spiral of doom. It's like a pretty nasty spiral where it's very difficult to break because of the combination of sympathetic overdrive and mitochondrial dysfunction.

There's also toxins in our environment, medications that a lot of people are taking that affect mitochondrial function, infections that do it, post-infectious syndromes as well.

And then where Methane Blue can come in is something called a redox cycling, which means that it can enhance energy production. It can compensate for challenges of making energy, but at the same time, it can also work directly as an antioxidant and clean up.

the products of energy metabolism, the products of making energy. So that's why I call it clean energy because it's energy without the byproducts of energy production.

You make ATP, but you also make those free radicals. So nothing, but especially at low doses for to maybe 25 milligrams around for most people. That dosing is fantastic for mitochondrial support.

So I use it a ton in clinical practice as a way to support mitochondria, especially people that have a long way to go into really seeing significant improvements with long-term optimization strategies, which can take a long time in some people.

With methylene blue, there are a couple of cautions. One, the potential for serotonin syndrome. And then two, just that, you know, if you have, it turns your urine a certain color and the labs will get kicked back.

So if you're trying to do a UA or look for, if you're trying to do a urinalysis or look for urinary tract infections or things, anything in the urine, we run toxin testing through urine, then you have to stop the methylene blue significantly ahead of when you're going to collect.

So talk me through how in your practice you navigate both those risks. Sure. So serotonin syndrome is a very rare condition where you get this sort of flood of serotonin in the body that could potentially be dangerous, cause hemodynamic compromise.

So your blood pressure, heart rate can kind of go crazy. With methylene blue, there has never been any studies that have shown that oral methylene blue combined with another serotonergic drug could potentially cause serotonin syndrome.

but IV for sure. So the reason why this can be an issue is that methylene blue also is called a monoamine oxidase inhibitor. It's an MAOI, which means that it increases neurotransmitters, including serotonin, norepinephrine, and dopamine.

And so the theoretical risk is that if you are taking an SSRI or an SNRI, one of the newer generation serotonin drugs, or potentially a dopaminergic drug like a Sinemet for Parkinson's or something like that, that you would potentially have an interaction where the methylene blue combined with the SSRI or SNRI would cause a serotonin syndrome.

But we don't see this in clinical practice really. I haven't seen this and I've talked to a lot of pharmacists and other clinicians about this. you're taking oral methylene blue and one of these drugs.

That being said, if you are taking a serotonin reuptake inhibitor of any type, I do recommend working closely with the provider just to make sure that you're okay.

I've seen some people with some GI distress combining them together. Most of our serotonin is actually made in our gut and not made in our brain. It's 95 or even maybe 99% of it.

It's over 90, 95% is made in the gut itself. And so I've seen some GI distress and diarrhea, abdominal pain, that kind of thing when you're combining them.

But it's also important to remember that methane blues monoamine oxidase inhibition is dose dependent, meaning that the higher the dose, the more you're going to see that the lower the dose correspondingly, you see less of that.

So. I don't see it being a very big deal most of the time in clinical practice. In fact, I have some integrative psychiatrists that are weaning their patients off of the SSRIs of the world, SNRIs and using Methylene Blue instead because it's got that neurotransmitter piece that I just mentioned.

And also it's working on mitochondrial function because that's a big problem in depression and bipolar and other mental health disorders is that mitochondria have significant dysfunction.

And we know this very well now that if you improve mitochondrial function and a lot of these mental health conditions, you can actually reverse or significantly mitigate the symptoms of these mental health disorders.

So I, I think that it's important to people if you're working or thinking about using Methylene Blue and you're on these medications to work with a provider, just to be sure.

But that's a big, that's just kind of a big thing that's thought to be an issue, but really not if you're not taking IV Methylene Blue. Now, yes, your Methylene, if you're taking Methylene Blue in any capacity, your urine will turn blue.

Or a shade of green or something like that, depending on whether vitamins you might have taken in the morning. So you do have to be aware of that. And it's, it is a stain in the sense of like, if you get it on a countertop or something like that, it can stain the countertops or your clothes very blue.

So in my house, I have. buffered vitamin C, that is kind of the antidote for it from a countertop washing machine sink issue. And this has probably saved my marriage at least three times now, because I got something somewhere and I scrubbed it very quickly with, with the buffered vitamin C.

So that's just a nice thing to have in the house. If, if you're going to try it and the type of methanol you're taking. also will give you either a higher or lower risk of getting it everywhere.

The liquids of methylene blue are the highest risk of getting it everywhere. And unfortunately, the liquids and almost every product that we've tested on the market, the liquids are the biggest culprit.

They never meet their label claims because the problem with methylene blue is that quality really, really matters.

Methylene Blue, Mitochondria, and Safety

It's made in a lab. And during the lab production of methylene blue, it could be contaminated with heavy metals like lead, mercury, arsenic, and cadmium.

Most of us don't want those in the supplements and products that we're taking. And the problem is that a lot of the things out there that are on the market, especially over the last year or so as methylene booze got a lot more popular are contaminated with heavy metals.

Even if their certificates of analysis say that they are not, we have tested them and many of them have higher levels than you would like. And that's not what you want, of course.

And also, and as I was mentioning, that's your purity side. And then on the potency side. This is how much nothing, but you actually are getting in the product that you're receiving in the mail.

And most of the ones we, we, we actually tested, especially the liquids are much less potent than they say they are on the labels. You're getting a lot less for what you think they are.

And then if there's any companies that are telling you they're making their methylene blue in the United States, they're not telling the truth because.

It's not possible to make methylene blue in the U S unless you're a pharmaceutical company. If you're a direct to consumer company and you're making methylene blue, it has to be coming from out of the country.

A funny story is that I spoke to a guy at least now about a month or two ago. He said, yeah, I bought methylene blue from a company that said there was making the United States, but it took three weeks to get through customs.

So you have to be aware of where things are coming from and what you might be getting along the way. And so at Transcriptions, we really do care about all that.

So we do source our Methane Blue from overseas, but we don't trust a certificate of analysis that we're getting from the overseas companies, even if these are providers that we, or manufacturers that we've worked with for many years.

We do our own independent testing again, when it comes to the United States to be sure it is what it says it is. And it's not contaminated and all those things.

And then, and only then do we put it in the products that we make. And then once we make the products, we test it again to make sure it's meeting our label claim.

So this is coming from a very clinician forward perspective. And because I see patients and I care about quality and I want to make sure that we're getting the best stuff possible for the people that I work with and everybody else as well.

So stitching away from these compounds, you also have deep expertise in hyperbaric oxygen therapy and red light. Can you share with us a little bit of your perspective, your clinical experience, what you've learned about that and how you're seeing that utilized?

I've been involved in hyperbaric medicine for the last decade plus now, and it's been a pretty significant evolution where the chambers are fantastic healing devices.

They really do help accelerate healing, decrease inflammation. They increase stem cells. They can fight infections. They have a lot of great potential indications.

And that's really because we're flooding the body with a whole bunch more oxygen that has a fantastic. what we call hormetic effect, a stress induced effect that causes all these physiologic changes.

And some of them are immediately, some of them are reversing low oxygen state. So that's why they've been studied, excuse me, hyperbaric therapy has been studied in strokes, traumatic brain injuries, heart attacks, spinal cord injuries.

And if you can immediately flood the body with more oxygen, you can actually save tissue from dying. And so that's good and great, but the other side of that is that if you're flooding the body with a huge amount more oxygen, you better have the capacity to do something with all that oxygen in a therapeutic way.

And what I mean by that is that when you're making a whole lot more energy, what are you also making? You're making a lot of also those reactive oxygen species that we mentioned before.

And so I realized very quickly in hyperbaric medicine that if you have more of a long-term condition, a chronic condition, or you have a long-term goal.

The better idea, the better framework is to think, well, how can I optimize the system to truly leverage the amount of oxygen that's coming in? So we're making as much energy as possible and that we're making all these reactive oxygen species that we have the capacity to leverage the benefits of that, which are stem cell release and blood vessel growth and, and new system optimization, mitochondrial biogenesis, all these kinds of things.

But that doesn't really work optimally if you don't have the capacity to neutralize the effect of that oxidative load, that huge amount of reactive oxygen species that happens in the chamber.

So that's where the foundational approaches are so important. For me, it's called health optimization medicine. That's a foundational approach that we use.

We actually have a nonprofit called health optimization medicine and practice or a home hope for short that trains practitioners on how to optimize health rather than focusing on disease and looking at foundational biomarkers, looking at mitochondrial health is a big part of that.

And so I use that in my clinical practice. And so if I can optimize the machinery for you to be able to produce energy effectively, so get oxygen to where you needed to go.

And then make sure that oxygen can make energy and then make sure when you make that energy, you can detoxify from it with enough antioxidant capacity.

That's when you see the biggest, biggest jumps in overall performance and optimization. And there's been really some awesome studies looking at. hyperbaric therapy for longevity, you know, reversing markers of senescent cell populations or these zombie cells that kind of get higher in populations as we get older.

Telomere length going up. I'm not sure how much I believe in telomere length, but that's another indicator that we've seen, but definitely blood vascular growth in the brain.

And we've seen this in normal people with normal aging findings, see revascularization of the brain or revascularization of the heart or revascularization of the genital organs and better erections for doing a hyperbaric program.

And then- I wanted to double click on the hyperbaric program because I hear different things out there, soft chamber, hard chamber, 40 dives, 90 dives, all within a month.

What is a typical hyperbaric program for a patient that you might work with, especially like somebody older suffering with cognitive impairment? So the real kind of first fork in the road for me is, is it an acute issue or is it a chronic issue?

If it's acute issue, then oftentimes it's really great just to get into the chamber. I can talk about different types of chambers in a minute. And then if it's more of a chronic issue, long-term issue, it's often better to think about foundational health first, optimize foundationally the ways we've been describing, and then think about a hyperbaric protocol.

Because acute protocols, if you have an acute issue, are pretty short. You know, two, five, sometimes 10 hyperbaric sessions can go a huge way at accelerating the healing process.

Hyperbaric Oxygen Therapy and Optimization

Okay. But if you have more of a chronic issue, then oftentimes we're talking about 20, 30, 40, sometimes 60 hyperbaric sessions done five days per week for a period of time.

And that's because the, the cumulative exposure of hype of oxygen in a hyperbaric chamber during that time shifts those. epigenetic markers, these markers on our DNA that help us express various things to help decrease inflammation and make stem cells really mature into various tissues or make blood vessels grow.

And then from there, it's like, well, okay, is it acute or chronic? If it's acute or chronic, then there's a different fork there. But then as far as what kind of pressure you're going to be using, There is different pressures depending on the indication.

Typically the brain is more sensitive to pressure and oxygen. So typically the brain pressures are around 1.3 to 1.8 atmospheres, which is the equivalent of being under around 15 to 25 feet of seawater.

The way we think about hyperbaric therapy is that we're combining oxygen and pressure and we're simulating the pressure you would feel under a certain amount of seawater.

And that, you know, water is heavy. You pick up a bucket of water. It's heavy, but you swim in it. You don't feel that. So in a chamber, we simulate the pressure you'd feel under a certain amount of sea water.

And that pressure drives more oxygen and circulation, not just on a red blood cells, which typically carry, but actually in the liquid of the bloodstream.

So the brain's more sensitive to oxygen. And so typically that's the pressure range for the brain. And then you have for the body, for systemically, it's about 1.8 to 2.4 atmospheres.

Again, 25 feet of seawater to about 45 feet of seawater is our main ranges. Now, of course, it's a spectrum and everybody's going to potentially be different depending on their indication and their health.

And you may not want to start at a very deep pressure if somebody's super sick. And there's a lot of nuances here, but soft chambers, the sort of the ones that like the bag like chambers typically go to about 1.5 atmospheres of

pressure.

And then the medical grade chambers, hard chambers typically go, start off, they can go to those milder pressures, but they can go typically as deep as 3.0, 3.0, like a single occupancy or maybe a two occupancy chamber.

And then if you're going to like a hospital or a place where there's potential dive injuries, where you have the bends, which is the initial reason hyperbaric therapy was invented.

Then you go to chambers that, you know, they're even much, much deeper than that depending on what's required. So that's, that's the spectrum there. And then for me, it's like, it's, it's never like a one size fits all kind of thing where, you know, I'm usually looking at hyperbaric therapy in the context of an acute issue.

It's like, well, how am I going to also. support them. I call it my educationally throwing shit at the wall strategy, right? Which is like, how am I going to support them as fast as I can, as quickly as I can, so they can benefit the most from going into the chamber.

And then in the long-term where they have more of a chronic or long-term goal, that's when I'm really educationally optimizing them using a whole framework that I've developed, like looking at health optimization medicine as the foundation, looking at supplements, looking at technologies, looking at other practices that might be helpful for them, looking at practitioners that can also be referral sources to help them along the way.

Physical therapist, is it a psychotherapist? Is it a psychedelic therapist? You know, whatever it might be. And of course there's the hyperbaric experience itself.

And then being dynamic about that, knowing that not everybody's going to fit into a mold and everybody, you're going to have to think about what's going to be best for them to start off with and where you want to go.

really individualizing it. Well, Dr. Scherer, thank you so much. Your wisdom and your passion is infectious, and I can tell that you are truly helping people optimize their whole health.

I, for one, am so grateful for the great sleep that I get these days because of you and the products at Troscriptions. I really appreciate how you've illuminated the importance of not only the GAVA system, but nicotinic systems.

You talked about glutamine. We've talked about methylene blue. We talked about a lot of things that I think are relatively new and maybe even controversial for people.

And so we're opening up this potential for them to get the benefits and understand some of the risks. And so this can just, I think, go a long way into helping people experience more calm, more clarity and balance in their daily lives.

So thank you, thank you, thank you. You've used some big words and we've gotten into the weeds on some of the science listeners. If they want to go back and listen again, please do.

Maybe even have that cup of coffee or experiment with a little nicotine before the next round through. For those of you who are listening, you can learn more about Dr.

Scott's work and explore some resources at Troscriptions, T-R-O-S-C-R-I-P-T-I-O-N-S, and we'll put that in the show notes. Also, DrScottShare.com, D-R-S-C-O-T-T-S-H-E-R-R.com.

Are there any others that you want to share with our listeners? Those are the two main places. I think those are great. I think that I know we talked a lot about the weeds here and the science, but in essence, what we're doing here is really trying to optimize your GABA system by short-term supporting it long-term, you know, using, you know, foundational, foundational health mark health programs like health optimization, medicine, and things.

And yeah, I appreciate the time, Heather. I think. On Instagram, you can find me at Dr. Scott Schurr, D-R-S-E-O-T-

T-S-H-E-R-R. You also can find the company transcriptions, which is the word itself is a mashup of trochee and prescription.

Closing Thoughts and Resources

So, transcriptions for people that are looking for it. You can find that at transcriptions. And then if you're interested in the nonprofit, you can check out healthoptimizationmedicine at homehope.org on the web.

What was the other place? Oh yeah. And if you're interested in hyperbaric therapy and the frameworks there or the integrations that we're doing at my company, you can check it out at onebasehealth.com.

Amazing. You've got a lot going on. Thank you for sharing your time. And to our listeners, if you found this conversation helpful, please share it with someone that you love.

And don't forget to subscribe so you never miss an episode. Until next time, I'm Dr. Heather Sandison reminding you to think well and age well. Thank you so much for listening to the Think Well, Age Well podcast.

If you enjoyed today's conversation, please take a moment to subscribe, leave a review, and share this episode with someone you care about. It's one of the best ways to help others discover tools and inspiration for aging well.

To stay connected, get bonus resources and never miss an episode, head over to drheathersanderson.com and join my email list. Until next time, keep thinking well and aging on purpose.