The Secret Role of Nitric Oxide on Brain, Mental, and Cardiovascular Health Transcript

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Introduction and Speaker Background

My favorite topics to discuss this topic of nitric oxide and this famous come up multiple times whenever we discuss brain and mental health, and so no one knows the subject better than the next person.

But to bring up, which is Doctor Nathan Brian. So that's, Brian earned his undergraduate degree and Bachelor of science and biochemistry from the University of Texas at Austin.

He got his doctor degree from Louisiana State University School of Medicine, where he was recipient of the Dean's Award for Excellence in Research. He has post doctorate, at Boston University School of Medicine and the Whitaker Cardiovascular Institute, and doctor Brian joined the faculty at University of Texas Health Science Center here in Houston.

And worked with a very famous person, Doctor Fareed Murad, who is a 1998 Nobel laureate in the medicine, physiology. Doctor Brian's, life has been really dedicated to involvement of nitric oxide research and has been for over the last 20 years and has had seminal discoveries in the field.

He is here to really talk about the understanding of how nitric oxide really plays a huge role in to brain health, so he's a successful entrepreneur as well, founder of, human.

And as well as Brian Nutraceuticals and as he's been responsible for, creation of a lot of really well-known products in the nitric oxide space. During Covid 19, he led a drug trial called No Virus, which is currently in phase two clinical trials for the treatment of Covid 19.

African-Americans, Hispanic utilizing nitric oxide. And so, without further ado, I'm gonna bring Doctor Brian to the summit. So, Doctor Brian, thanks for coming on.

And, speaking again, it's been a while. Appreciate has been to see you. Good to be with you. Good seeing you. So, you know, we've been talking about this nitric oxide deal.

Throughout this summit. And for those of you who are just listening to this segment alone, what I'm talking about is one of the substances that we are required to survive.

And, most people, have some sort of the fishing season. And that translates into not just brain health, but overall health as well. But of course, the summit's about better brain health.

So we're going to talk about that. So let's talk about nitric oxide. So that's Brian. You are the experts in this topic. So let's talk about why is nitric oxide important when it comes to brain mental health.

Well good. It's my favorite subject obviously. You know I've been in the nitric oxide space for more than 20 years, but with over 185,000 papers published in the scientific literature, it's clear that nitric oxide is one of the most important molecules produced in the human body.

It's what regulates it, controls blood flow and circulation to every organ, tissue and cell in the body. It's how our immune system fights off invading pathogens, viruses, bacteria.

And it's a neurotransmitter, the central nervous system. So when we talk about brain health, we're talking about neurotransmission, but we're also talking about perfusion and circulation.

Why Nitric Oxide Matters for Brain Health

And we know that people with neurological disorders, whether it's bipolar, Alzheimer's, vascular dementia, Parkinson's, that's all characterized by reduced blood flow to certain regions of the brain.

So we can restore blood flow and circulation and oxygen neutral with every cell in the body in those cells can perform without it, they fail. The tissue becomes dysfunctional.

We develop end organ disease. And that's typically the death of many people. In fact, that's the number one reason for the loss of nitric oxide is the reason for the number one killer of men and women worldwide, which is heart attack, cardiovascular disease.

Right. And of course, especially since the pandemic, we know that nitric oxide depleted people, tend to have the highest risk for Covid 19. And we also know during Covid that those people who are more sedentary, elderly.

So these are people who are already at risk for low nitric oxide, if they were to do things that increase nitric oxide, which is exercise, eating right, stuff like that, they actually decrease their, mortality, mobility for Covid 19.

And so something that that's rooted in our immune system, like you said, and rooted in longevity. Now, what do you think it is that a lot of people are depleted and what percentage of population are depleted?

Nitric oxide. Well, the best estimates are 50% of the people over the age of 40 have compromised nitric oxide production, what we call endothelial dysfunction, meaning they're invisible cells aren't functional to produce these.

These are active substances, including nitric oxide, to regulate blood flow. And that's kind of on a broad, broad level. But you know, the data also tell us that we lose about 10 to 12% of our endothelial function per decade.

This starts in the late teens or early 20s. And a lot of this is dependent upon diet and lifestyle. You know, we know sedentary lifestyle leads to nitric oxide deficiency.

You know, a poor diet, a high carb, high processed food all leads to an in like product on the last enzyme, which causes disruption in nitric oxide production.

Interestingly, we're finding that people who use mouthwash disrupt the oral microbiome and become nitric oxide deficient. And that's 200 million Americans that wake up every morning just about you know, it makes no sense to me because, you know, we we know not to take antibiotics chronically.

We don't take antibiotics every day of our life because we know it disrupts the the microbiome and causes a lot of problems. So why would you use a mouthwash and antiseptic mouthwash every day to disrupt the oral microbiome?

So that's a major problem. The other thing is fluoride. Fluoride in the drinking water, fluoride in the toothpaste. All right. So antiseptic. It's killing the good bacteria the bad bacteria.

It's a neurotoxin and it disrupts your thyroid function. And then the other problem is antacids. You know, as specifically proton pump inhibitors or PPI is this red box that production.

And now we know that there's data showing that people who have been on PPI for 3 to 5 years have about a 35 to 40% higher incidence of heart attack and stroke, because of the disruption of nitric oxide production.

So if you look at the American population, the American diet, we're not getting the right nutrients. We need all Americans. Are you two out of three Americans are using mouthwash?

There are over 200 million prescriptions written for proton pump inhibitors every year. That's not even counting the over-the-counter purchases. And Americans are sedentary by design.

We get in our car, drive to our office, sit in a chair all day, and then drive home. And now we're not active. So it's really no mystery to me why we have the sickest population.

Everything we do disrupts nitric oxide production, and the clinical consequences are obvious. So you mentioned earlier and I just want to define is that endothelial cells and these are cells that are responsible for this production of nitric oxide.

So where are the endothelial cells. And what is the trigger that triggers them to make nitric oxide. It's a very good question. So taking a step back we know that the body there's two ways the body makes nitric oxide.

One is through an enzyme called nitric oxide synthase. And that's located in the endothelial cells. So the endothelial cells are the single layer of cells that line every blood vessel throughout the body is found in them on the static system.

So it's basically how you get the good stuff in the bad stuff. So this enzyme nitric oxide synthase is stimulated by, you know, shear stress. So when we begin to exercise so we we see an increase in blood flow that tells the endothelial cells, I need to make more nitric oxide to deliver more oxygen and nutrients to these downstream tissues.

And if you can do that, then your body performs normally. If you can't, then you develop exercise intolerance for finding you develop insulin resistant type two diabetes.

You develop mild cognitive disorders. You develop cardiovascular disease. So it's the earliest event and the onset progression of every major age related chronic disease.

What Depletes Nitric Oxide

So to answer your question, it's the function of the endothelial cells or the endothelial cells ability to produce nitric oxide when stimulated when activated that determine your health and how resilient you are to not just pathogens, viral infections, but also the early onset of Alzheimer's and neurological disease or even cardiovascular disease.

Right. So how does so, so earlier we talked about, nitric oxide being a lot like lymphatics, meaning blood vessels are all of the body. Right. And there's also, it's the brain has its own lymphatics called the lymphatics and its own blood vessels and own nitric oxide.

And we know that, a lot of brain health related disorders, whether it's Alzheimer's and strokes and stuff like that, stems from this, this long period of chronic depletion, of this production of nitric oxide.

And so, I guess in theory, what we have to promote then is behaviors and things that we can do to increase our nitric oxide over time. So correct. It's absolutely correct.

It's truly the holy grail. And and not just cardiovascular medicine but really systemic medicine. It affects every organ, tissue and cell in the body.

And it's more than that. So you know we talk about perfusion getting enough blood flow to these organs including the brain. But all diseases are characterized by three fundamental problems.

It's inflammation oxidative stress and immune response. And when nitric oxide is sufficiently produced by the in the female, it decreases inflammation, increases oxidative stress, and inhibits the immune dysfunction.

So without nitric oxide, you don't get blood flow, you get inflammation, you get oxidative stress, and you get immune dysfunction. And those are the hallmarks of every single chronic disease, no matter where in the body.

Okay. Well let's try and breathing for a second, because in another part of the summit, we talked about how our ability to, take air in through the nose, around the, sinuses is able to actually help us also to produce as nitric oxide.

So how important is this process? Well, we talk about being in the belly of cells where the nitric oxide enzyme is found. But they're also found in the epithelial cells.

So the endothelial cells are found in the lining of the blood vessels. The epithelial cells are found in the the the sinuses and the airways all the way down to the bronchioles, in the alveoli, right in the wall.

So when we when we deep breathe in, when we do nasal breathing, that creates shear stress. There's mechanoreceptors on these epithelial cells and that tells the cells to make nitric oxide.

But if the nitric oxide synthase enzyme is dysfunctional and uncoupled, then we can't generate any nitric oxide, even though we're nose, we're nasal breathing.

So the beauty of this is if you have endothelial dysfunction, you have epithelial dysfunction, the same conditions that cause endothelial dysfunction because uncoupling of the nice enzyme in the other.

So we're still good to breathe to do nasal breathing. And those breathing you know, we're compromised if we don't do the things to restore nitric oxide in a fundamental discovery about seven years ago, revealed that nitric oxide is required for oxygen delivery to the periphery.

So the cardio respiratory cycle is a three guesses. So prior to this, we thought, well, can we breathe in oxygen. Right. We deliver that oxygen and we exchange it with the blood in the in the lungs.

And then we excrete carbon dioxide. But now we're recognizing the nitric oxide is the third gas that's required in this system. Because nitric oxide is required for oxygen to be offloaded from hemoglobin to deliver that to the.

And that's been obvious in Covid patients because you see these people desaturate in their blood. Oxygen saturation goes from normally 9899 down to, you know, sometimes a high 70s low 80s.

And it's critical and you put them on 100% oxygen. You get their oxygen saturation doesn't improve. It's because they don't have the nitric oxide signaling aspect to restore that oxygen saturation.

And that's the beauty of our nitric oxide drug. Now we have in phase three trials for Covid. Once we restore the functionality of nitric oxide, we see blood oxygen saturation to go from 78 to 98 within a period of eight minutes.

So the most important thing that most people don't realize is that you need nitric oxide to take up oxygen and deliver oxygen to every cell in the body.

Without it, you don't deliver. So it's not just about exchange of carbon dioxide breathing out, oxygen coming in nitric oxide itself is a gas. And that gas is also required for that exchange, the handoff of oxygen to be delivered to our body through to binding of hemoglobin, which is what makes our blood red.

And in case I can't tell you how many people I found to be, like, have low iron, which means they have low hemoglobin and an anemic and, low iron is really a undertreated phenomenon that's happening in the United States.

And that also, is hugely implicated in the less exchange of the oxygen to the body that's supposed to be facilitated by nitric oxide. Right? That's exactly right.

And I think the iron, the low iron can be related back to the use of antacids. You know, the stomach can absorb iron or b-vitamins or a lot of other trace minerals and nutrients without stomach acid.

So this epidemic and, you know, the people that are on and assets become anemic, it become low in vitamin D, they become low and B vitamins, selenium, chromium.

And as we know now and recognize that most human diseases are caused by two things and two things. Only the

human body is missing something that it needs or exposed to something that it doesn't.

And most Americans are depleted in some one or more nutrients. And on the topic of antacids, and I think this is sort of the general principle of medicine, the current modern medicine is that there's a symptom that's inconvenient.

We try to suppress a symptom with the drug, but no one really looks at what happens over a long period of time when we do it.

How the Body Produces Nitric Oxide

So even when you go to the store and pop some times because you have acid reflux, your body's telling you not to eat what you just ate, but you pop some Tums and and continue eating what you eat.

And that has huge, huge implications for for absorption, for digestion and over time that the body's nitric oxide production and that turns into whatever disease we put at the end of it, you know, Alzheimer's disease or or anxiety, bipolar or PTSD.

A lot of these issues that really pop up. So if everything here, if of most chronic diseases are a lack of something or too much of something that we our body doesn't mean, and nitric oxide sort of like the middle equation, there, can nitric oxide be supplemented?

What do you think? Yeah, absolutely. So we've got, you know, 15 years of clinical data on ways to restore nitric oxide production in the human body so we can do it.

And the challenge for this over the past 30 years, you know, big Pharma has failed at making a safe and effective therapy because nitric oxide is a gas and it's a gas with a half life of less than one second, meaning when it's produced in the human body, it activates some signaling, some targets, and then it's gone.

Take less than a second to activate the signaling pathway. So the challenge has been how do you create a bioactive gas in a solid dose form that's shelf stable, that's activated when put in the human body?

That's kind of the holy grail in medicine. And we cracked the code on that. I guess about almost 20 years ago, 15 years ago. So probably dozens of issued US international patents on ways to restore nitric oxide.

The first way we did this was through laws and orally disintegrating laws. And then when you put this lozenge in your mouth, it's activated by your saliva.

And this matrix slowly falls apart. And as it falls apart, these active components come together and generate nitric oxide. Yeah. So if your body can make nitric oxide, we do it for you.

But we also understand the entomology to the extent that we can recover the nice enzyme and improve the body's own ability to make. So you can do this through a lozenge, which is our primary delivery.

We've made some fermented beet powders that, you know, beets are becoming very popular item in terms of supplementation and exercise performance. We've perfected this, the fermentation process where we can, you know, concentrate the nitric oxide activity, and then you pour this in water, you take it as a shot, and we can, improve performance that way.

So that's how you supplement it in terms of nutrition and supplements. But we've also got, you know, drugs that were developing through the FDA for, for specific indications.

We've got a Covid drug in phase three clinical trials. We're about to enter a phase three trial for a non obstructive pulmonary artery disease, a growing condition which there's no effective therapy.

Then we've got a pilot study going in for Alzheimer's because we recognized kind of a topic of this summit. People

that get Alzheimer's or vascular dementia or even mild cognitive disorders are the people who have poor circulation.

And that's data from Daniel Lehman showing that through Spect scans that these neurological conditions are characterized by decreased blood flow or perfusion to certain regions of the brain, and then the neurological symptoms come on.

And then we developed a topical nitric oxide drug for diabetic ulcerative not healing. So I think and we think that this is the way patients are going to be treated in the future, because there's no indication that we could even think that we're nitric oxide at the right dose, at the right time, and the right patient would not be beneficial.

So, well, this is different than than most pharmaceutical drugs that most pharmacies would drug. Once again, it's trying to treat a symptom or some sort of a number that's there.

Right. Whereas the nitric oxide relation is to it's to have restore of some level of function. Right. Yeah. No. That's right. Most drug discovery programs are inhibitors of certain enzymes in the about.

So whether this are like Cox two inhibitors the vioxx Celebrex drugs the you know Cox inhibitors like aspirin and instead so you're inhibiting a specific enzyme that's different than what we do what we do.

And our drug discovery is called restorative physiology. So we're basically giving back what the body's missing. We're not inhibiting some enzyme. We're restoring normal physiological function in a way that's fully restored.

So when you do that we don't expect any side effects. In fact, we dosed over 500 patients with very sick Covid patients. No side effects, no adverse events.

In fact, the only the the only reaction is that they get better. So I think that goes to the point that if we use restorative physiology in our drug discovery and drug design and give the nitric oxide at the right dose at the right time to the right patient, again, there's no indication when we think we wouldn't provide benefit to the patient.

So lots of benefit, low risk right. Yeah. Well it's it's all dose dependent. It's you know in the two little nitric oxide that we know too much nitric oxide that but the toxicity is defined by two things.

And two things only. It's low blood pressure. And we haven't seen any unsafe drop in blood pressure in our Covid studies. And the other is a condition called hemoglobin eating, where if you take a lot of nitric oxide you oxidize the heme, McLovin, the heme iron in hemoglobin, and you reduce the oxygen carrying capacity of the blood.

Breathing, Oxygen Delivery, and the Third Gas

But you will see an unsafe drop in blood pressure long before you ever see an emergent globin formation. So what we do is we haven't given the right dose at the right time.

We know how much nitric oxide a normal, healthy human makes, and we dial that level in to all of our nitric oxide technology. So aside from, supplementation and form of therapeutics, what are some things that our listeners can do at home starting tomorrow, to improve their natural gas production?

Naturally. Well, it's very simple. Nitric oxide is a very complex, complicated science. But the solution is really very simple. And it's two things. Stop doing the things that disrupt nitric oxide production and start doing things that promote it.

So if we if we dig a little deeper in that. So what's disrupting nitric oxide production? Number one, we don't need enough green like the primary source of inorganic nitrate that the body uses to make nitric oxide.

So throw in more green leafy. That's the other thing. If you're using mouthwash you have to stop. We're disrupting the oral microbiome. We're causing an increase in blood pressure, and we lose the benefits of exercise.

If you use not one. The other thing is get rid of fluoride. Use fluoride free toothpaste. Don't drink municipal water. Get your water filtration system.

Remove the fluoride from the water you drink, you bathe in, you cook in. And then if you're on an acid, you have to figure out a way to wean yourself off of antacids.

These drugs were never approved for chronic use. They're only approved for acute use 3 to 5 days for acid reflux. Yet people have been on these for many, many years and the consequences are are severe.

So if you just stop doing those things, your body will thank you. Because now it's able to perform, it's able to produce nitric oxide. And then to add to that, start exercising very moderate physical exercise.

Get out in the sun 20 to 30 minutes of sunlight a day. There's certain wavelengths of light, both UV and infrared and infrared, to stimulate nitric oxide production.

And then when all else fails, you can take some safe and effective nitric oxide products that we've developed over the years. Right? And of course, stuff like cigarets and pollution stuff also deplete your cigaret smoking span.

In fact, every major cardiovascular risk factor disrupts nitric oxide production. So just stop doing the things that we know are bad for us. Start doing the things that are clinically proven to be beneficial.

And most of those will promote nitric oxide. How important is sleep in this equation? Well, sleep is absolutely critical. I mean, when we sleep, it's how our body repairs, right?

So we're regenerative beings. So when we sleep at night, it's how our body repairs and replaces dysfunctional cells. So in order for that to happen, we've got to be able to deliver oxygen and nutrients.

What we need to make a new cell that works properly during our sleep. But if we have obstructive sleep apnea or we have disrupted sleep patterns and we're not delivering oxygen in the raw materials to the cells that need to be replaced or repaired, then we develop organ dysfunction and we develop symptoms and the symptoms aren't resolved.

We develop chronic disease, so the body cannot and will not heal without sleep because we're not delivering oxygen and the body will not and cannot heal or perform optimally without my production.

So it's all tied together. Everything we know about health and well-being, revolves around the production or the delivery of oxygen, which is dependent upon the production of nitric oxide.

So, and I think another few points about sleep is that, most people who have chronic acid reflux is actually from chronic sleep disorders or insomnia or sleep apnea.

And if you just increase your sleep and crucial quality sleep towards your doctor, work with your doctor on any sleep disorder that can eventually help you take you off of the chronic acid blockers, right?

And then sleep also can stabilize your your blood pressure so it can possibly take you off of blood pressure medicine. If it all goes well, and I think that is, you're right, that part of that restoration is leads to, downstream things that can improve nitric oxide and take away the bad things that, that depleted.

Now, I want to go back to mouthwash for, for because you were the first person to tell me that years ago, about mouthwash. And I was really shocked. Right.

So mouthwash and antiseptics are basically, almost like an antibiotic hit to your, your oral cavity. Right. And so, most people don't understand that there is such a thing as healthy bacteria that's in the mouth.

And, just like there's healthy bacteria that's in the gut. And so it's so interesting that when you take that away, we're

seeing these issues. But, you know, a lot of, conventional dentists and doctors have been saying for a long time to utilize mouthwash, where's the disconnect here?

Well, you know that. And I speak at a lot of these dental conferences now trying to raise this awareness. You know, the number one response I get back is, well, that's the way we've always done, there's something called progress in science and medicine.

And if we continue to do the things we've always done in spite of all the progress and new understandings, and you're doing your patient to the service.

But the dentist look at obviously periodontal disease, the gingival tissue. And there's certain bacteria that are known to cause periodontal disease and gingivitis.

And there's what's called the oral systemic link that people with, you know, poor oral hygiene, gingivitis, disease have an increased risk of heart attack and stroke.

So what's the mechanism? For years people thought it was translocation of the bacteria, because you can find this bacteria in the plaque of an am I the person that suffered acute cardiac arrest?

But it's more than that. It's disruption of nitric oxide.

Supplementing and Restoring Nitric Oxide

So when we talk about the microbiome we now understand how important the microbiome is. Early investigators focused on the gut microbiome of the GI tract.

We started focusing on the oral microbiome about 15 years ago, where it became apparent that if you use mouthwash and disrupt this community of bacteria, we saw an increase in blood pressure.

And then that led us to the discovery that they're nitrate reducing bacteria that live on the crypts of the tongue, that reduce inorganic nitrate from the foods we eat in the nitrite and nitric oxide, and that regulates systemic blood pressure.

So we and others have published, if you take people and you give them mouthwash for seven days, we see an increase in blood pressure. If you take people and you use mouthwash and you exercise, you lose the cardioprotective benefits of exercise.

So the antiseptic is going in, especially alcohol based mouthwash. Is there indiscriminate? We kill bacteria, they kill the good guys, they kill the bad guys.

And this whole ecology of the microbiome in the mouth, the more diverse the the ecology, the better the oral health. And it's like anything, the good guys keep the bad guys out.

And it's a true symbiotic relationship. Meaning we need these bacteria that live in and on our body to do things that we as humans can't see. And we are when we eradicate these bacteria through overuse of antibiotics, through using antiseptic mouthwash, then bad things happen.

There are clinical consequences to disrupting the microbiome. Let's shift the topic a little bit to mental health. Now we've been talking about cardiovascular and brain health, but the same conversation really applies means, for example, you know, attention deficit disorder and attention deficit hyperactivity disorder.

We know those are nitric oxide depleted, states. We know that chronic anxiety, chronic insomnia, we know that bipolar disorder, right. These are nitric oxide depleted states.

But we're seeing this. And it's so common to see this within the younger population. And now it's really normal for,

you know, a kid to walk into class and he has a prescription for Vyvanse or Ritalin.

Right. And so, can you relate that to sort of this nitric oxide process and what we can do about it, you know, everything we're exposed to, whether it's, you know, and it's the foods we eat, you know, there's, there's, herbicides, pesticides.

A lot of the recent data I read was 85% of people in America have a glyphosate for roundup was detected in a year. So we're exposed to these things. And glyphosate obviously disrupts nitric oxide production.

There's data coming out that 5G, that frequency disrupts nitric oxide production. Poor diet, sedentary lifestyle, soft drinks, everything that really young kids do today is disrupting nitric oxide production.

And it's leading to not just neurological issues, but, you know, you're seeing young men in their early 20s presenting with erectile dysfunction. I mean, and that's that should be the prime of your life in terms of blood flow and performance.

And yet I've seen it around late teens, early 20s, which is a nitric oxide deficiency problem. So if you have endothelial dysfunction in the coronary artery to develop angina, then you have endothelial dysfunction in the vascular bands of the sex organs.

You get into female dysfunction in the vascular bed of the cerebral arteries, everywhere. So it's not limited to just cardiovascular disease. It's every organ has to regulate its own blood flow and perfusion and be able to increase blood flow upon demand, whether it's in the brain and you're trying to recall memory or whether it's to the sex organs, when you're, you know, trying to have a sexual encounter, you have to increase blood flow in order for that organ to work.

And that's the role of nitric oxide. And, on another part of the summit, I interviewed Doctor Felix Lao, oral health and oral airway dentist, and we talked about nitric oxide in a very interesting way.

I've never thought about this before, but, we talked about how a lot of kids and even adults these days, have obstructive airway disease or other sorts of, apnea, tongue ties and high pellets.

So much so that when they breathe at night time, their tongues can't occlude the top part of the palate. So it decreases the amount of air coming into the sinuses and therefore that decreases the local nitric oxide production.

And so, what we were talking about is how prevalent this sort of physiology is in adolescents and even adults with HIV in the 80s, Steve. And one of the biggest implicated is and really mental health is oral airway disease.

Right. And so I think that, as we talk about, you know, nitric oxide as a thing, well, let's talk about replacing. So, you know, obviously breathing is important taken away the, the, the the mouthwash, by the way, is all mouthwashes or just some other places.

Well, it's, it's any antiseptic mouthwash. I mean, we've tested things like chlorhexidine, which is a prescription mouthwash used for chronic halitosis patients.

We've tested Listerine scope, alcohol based mouthwashes, anything that indiscriminately kills the bacteria and disrupts the microbiome causes a disruption in nitric oxide production.

Okay. So, so, so knowing that and then of course, trying to, eliminate, fluoride, which can be really hard because, you know, a lot of the, the, the healthy toothpaste and, fluoride as well these days, and then, and then understanding that, a lot of our body's, needs are met whenever we do things that that increase nitric oxide is there.

Do you do you see any disease state, any disease state at all that, can be harmed by by increasing nitric oxide? I'm not saying to higher than dangerous levels, but in general, no we haven't.

I mean, again, it's dose dependent. And if we give the amount of nitric oxide that we know is restored and there's not a single disease that would it be counter, counterintuitive or hated.

Lifestyle Habits That Boost Nitric Oxide

You know, early on we thought sepsis now because the problem in sepsis is you get, you know, a loss of blood pressure. You get, loss of perfusion to organs, and then you develop into organ failure.

And that's how people die of sepsis. But years ago, probably 20 years ago, they developed some nitric oxide inhibitors that they used in a clinical trial to septic patients just to see if they could prevent the loss of pressure and, and perfused the organs.

And what they found was a clinical trial was that the, the inhibitors of nitric oxide production actually made the condition worse. In fact, they stopped the trial.

So that told us that it's probably not by overproduction of nitric oxide. It's leading to end organ failure and death in septic patients. It's something more complicated.

So that would be the only thing that we could even rationalize in. The nitric oxide field. But again, those data didn't turn it up. But to answer your question, there's not a single indication for disease state or any symptoms that we thought were nitric oxide wouldn't be beneficial because it's delivering oxygen, delivering nutrients, preventing inflammation, oxidative stress and immune dysfunction to every tissue, organ and cell in the body.

So, you know, this reminds me kind of the the topic of like stem cell, sorry, the stem cells is, the cells in our body that can differentiate and repair, other cells, that are there.

But once it nitric oxide also needed for stem cells to proliferate to. In 1996, there was a paper published showing that nitric oxide is the signal that tells our own stem cells to mobilize and differentiate.

So if your body can't make nitric oxide, the stem cells don't mobilize and they don't know where to go, don't know what to do because they don't get the signal.

So that leads to a loss of repair, a loss of, regeneration and the onset and progression of chronic disease. And more to that, you know, every single chronic disease characterized by mitochondrial dysfunction, mitochondria, the organelles that provide the cell, the energy for and nitric oxide is what controls and regulates mitochondrial biogenesis and the efficiency of ATP or cellular energy production from oxygen.

So we think nitric oxide is this unified theory of aging, whether it's loss of stem cell function, whether it's mitochondrial dysfunction or shortening of telomeres.

Nitric oxide is what controls all three of those. So you really as I mentioned earlier, your body cannot it will not heal until you restore the production of nitric oxide.

It's really that simple. Right. And so, you know, and and this makes me really understand why that a lot of people who get like regenerative stem cell therapies and whatnot, if they're still doing habits, that's depleting the nitric oxide, it may not work.

Just because there's no signal there. Right. Well, you know that you can see those data coming out now. And that's the stem cell industry is kind of the wild, wild west because there's no standardization.

People going in for different conditions, whether it's orthopedic or post MI or neurological conditions. If we and we've got a number of stem cell clinics and docs that use our nitric oxide prior to your mobilization and deployment of stem cells, because the body needs that signal to way when you deploy the stem cell to do any regenerative medicine therapy, then the body's going to respond to that.

But you have to restore the nitric oxide in the body before you deploy any, any regenerative medicine therapies, including stem cells. And so okay, so I'm going to tie this, let's talk about sleep apnea for a second because, technically 1 in 4 humans have some sort of sleep apnea.

So 25% of people watching this, have sleep apnea and probably everyone knows someone with with without any is or they snore. They just have been diagnosed yet. Right.

Now sleep apnea, basically is a condition where, nighttime people either stop breathing or have trouble breathing, because of either obstructive airway disease or the body telling them not to breathe for one reason or another.

Right. And so I have sleep apnea. So now how this works is that, you know, whenever that happens, there's a lot of signals, that gets thrown off, especially at night time, every time the oxygen level goes low and the nitric oxide production just shuts off.

And so that right. And so, if and that's why, a lot of people in integrative health, you know, we talk about treating the sleep apnea is as a non-negotiable.

You know, if it's like a supplements eating right and exercise and you're not treating sleep apnea, then you can have completely depleted nitric oxide.

Right. And so why is it, that well let's let's back up for a second. So earlier we talked about how there are supplementation for nitric oxide in specific situations where, you know, whether it's like ferments, beets or whatever like that.

Right. Is that enough to overcome someone with sleep issues or sleep apnea? Their actual production? Nitric oxide? Well, I don't think it's enough to overcome it, but people with obstructive sleep apnea have to take some form of nitric oxide supplementation because their body is not making.

And it's the same concept if you're low in vitamin D, what do you think you have to supplement vitamin D? If you are low in testosterone or estrogen, then we take we have to supplement that and give the body back what it needs.

And it's a two way street.

Sleep, Sleep Apnea, and Recovery

We need we need oxygen to make nitric oxide. That enzyme requires oxygen. So if we're not delivering oxygen to the in the female cells and vascular beds, and you can't make nitric oxide, that if you can't make nitric oxide, you can't deliver that to the cells.

And so it's it's a perpetual cycle that you have to intervene through one or the other. And I think if you as you mentioned, you have to correct the sleep apnea, but you also have to provide a source of nitric oxide until the body is able to generate that.

So and so this is obvious. And, you know, most heart attacks occur before 10 a.m. in the morning. And I think that's because of people with obstructive sleep apnea or other risk factors for cardiovascular disease or heart attack is they sleep all night.

They're not they're hypoxic. They don't realize it. And then they get up to start to to move. And then their blood vessels can dilate to support that.

They're inflamed, the plaque ruptures, and that's heart attack and stroke. So the best thing you can do is take your nitric oxide at night before you go to bed, so that if you're on a CPAp or any other type of sleep device, you're going to be able to better deliver that oxygen and prevent the inflammation.

So then when you wake up in the morning, you'll suffer an acute MI. And, you know, have early premature death. All right. You convinced me. I'll take that tonight from my sleep.

Now that's great. So, and one last question before we jump off. It's been such an interesting discussion. So, earlier we talked about, this condition called sepsis.

And for those of you listening who don't know, sepsis is basically a condition that the body becomes, when there's an infection, and the infection spreads into the bloodstream.

We call that septicemia. And sepsis actually is the first stage of going towards death, if you will. And when sepsis occurs, multiple organs, the brain, the heart, everything can be really affected.

And when that occurs, the blood pressure can become low. We call this septic shock. So earlier we talked about, well, is septic shock, the lowering of the blood pressure.

Is that too much nitric oxide, in the blood vessels causing the blood pressure. And, and the answer is no, because when to give nitric acid blockers, blockers, people just got worse.

It turned so and I'm not I'm saying this is because there's a lot of people are listening to this right now that are on, nitrous oxide type, medications like I still and stuff like that.

Right. And so, and I want people to understand those medications are not what we're talking about. They're not the same thing as we're talking about in terms of nitric oxide.

But a lot of people, especially, people in the in the cardiology field, I feel that maybe too much nitric oxide can lower the blood pressure in these in these people. And the answer is no. Right.

And the answer is they probably need more nitric oxide to combat the actual infection because their immune system can be restored. Nitric oxide, rather than rather than having too much nitric oxide as a problem.

Right. Yeah. So that's right. Those drugs are called organic nitrates. So things like nitroglycerin might survive, right. To do those drugs are metabolized into nitric oxide.

And those have been used for probably 200 years now for the treatment of acute pain. And a lot of times they'll give them an in post in for patients, for patients who suffered heart.

The problem with those drugs are that they you develop tolerance to them over time in the outcomes data, so that people who have been on organic nitrates for a long period of time actually do worse, they get worse.

So you develop tolerance to what's called tactical access to those drugs, because these are requiring mitochondrial enzymes to metabolize those into nitric oxide.

What we do is completely different. We're not dependent upon the mitochondria, which most people they're dysfunctional. We deliver nitric oxide gas and natural product chemistry.

Sepsis, Drug Distinctions, and Closing Resources

That doesn't lead to any tolerance development, no unsafe drop in blood pressure. And so it's completely different. The overall objective is the same is to get nitric oxide.

But the mechanism of getting that nitric oxide in the human body is completely different. So yes, you really want to make that distinction because a lot of times we actually do prescribe that.

The tablets that you're talking about and the nitric oxide within the clinic, well, there's a huge misconception, thinking that that's natural glycerin that people take in the forms of drugs like, no, it's not, it's not quite the same. It's

quite the opposite, actually.

Yeah. And so, you know, wonderful. So, where can people find you to learn more about the stuff in the products that you talk about? Where can people find all that stuff?

Well, you know, I try to I direct people have an educational website. It's Doctor Nathan S bryant.com. I do a monthly blog. I encourage people to educate themselves on nitric oxide.

You know, my job is not to sell you products. My job is to provide education so consumers can make informed decisions on what's best for them, and to listen to the advice of their health care practitioner and physician.

You know, we've developed a number of really innovative nitric oxide products over the past couple of decades. We have a, a nitric oxide skincare system where, you know, the skin is an organ just like any other organ, and without sufficient blood flow, it fails.

So we developed a topical nitric oxide. Product. It's in 101.com that's in is in nitric. The, the number one ozone oxide. The number 1.com. We'll provide a code for your listeners, a coupon code, then get 10% off and free shipping.

And then our oral nitric oxide products are at, you know to you.com. That's him IMO. The number two the letter u.com. We have an early disintegrating tablet.

We have a fermented beef powder where we've taken the beef, taste the beef, color the beef pop out of it. So it's a great tasting sweet berry flavored, beef product.

It's a we put mitochondrial enzymes in there so we improve energy production, put electrolytes in there because most Americans are dehydrated. And that's a fantastic product.

I think it'll replace, you know, the five hour energy drinks or the monster drinks, the really unhealthy things that people go to for natural light. And we provide natural energy in form of with increased nitric oxide, better blood flow, better energy production, better hydration.

And it's just a great product technology. And then and we know that the five hour energy drinks and then the monster's actually decreased blood flow to the brain.

So yeah, they're affordable and they're herbal drink. And then to find out more about our drug studies, we've got nitric oxide innovations.com. We've got four drugs going into clinical trials.

Now for specific indications. And we're very excited about that because we think we're going to change the landscape of health care in how patients are treated, the next 100 years.

Awesome. You are truly the bridge between innovation, science and execution in the world of medicine through regeneration. You know, it's probably my best words to describe you.

So I want to thank you for being in that and that position. I mean, this is, this is certainly a lot to take in. And for those listening, I know we use a lot of big words, here, but I challenge you, to create a higher level of understanding by going to doctors brain sites and checking it out.

So once again, thanks for coming on to the summit and truly appreciate you. Thank you, Dr. Grant. Appreciate all you do.