Podcast Introduction and Guest Background

You are not just the sum of your diagnostic markers. You're more than that. And you go to clinical practice today and they read out to you saying, oh, okay, not okay.

Let's fix it. Okay, that's it and then here's a statin because you have high lipids and here is a pill because she got a headache and there's this, and you're so right.

If you dig into it, the whole idea of understanding evolutionary biology. How did we even come about as humans? How physiologically this whole thing developed?

Once you start asking those questions, it'll start to give you understanding and answers that you should be seeking for. Because that tells you that all these, I mean, humans have not been around for that long, but the role of the mitochondria has been a round for two and a half billion years.

Right on. Yeah. Okay. It's like the beginning. In every episode, my expert guest and I dive into real conversations about what's broken and how we can fix it by making healthcare about people, not just managing disease.

It's time to rethink what healthcare should be and we how can make it better together. Welcome to the podcast. Hello guys and welcome back to the My ND Unscripted podcast.

I'm your host, Dr. Clint Carter, and I am here with Dr Sundeep Dugar. He has like 40 years of experience in the medication, pharma research world and not your average functional medicine guy that we have on this show.

A lot of the times I think we're in for a treat today and he has, you know, he's kind of gotten out of The Big Pharma Game looking more into mitochondria and where we're going with this stuff.

So, you know, overall, Dr. Sandeep, thanks for, for coming on with us, man. Give us a proper introduction, how we got here and let's get this thing rolling.

Great, great. Thanks Dr. Carter for being the host for such a wonderful conversation. And Sundeep is good. So we'll just get down to our first name because, and so as you said, you know, I've been in this area of pharma drug development, drug discovery for a long time.

I have a couple of drugs that I'm a co-inventor of that are on the market. And pretty much touched most disease areas you can think of, you know, from neurodegeneration to metabolic to cardiovascular.

About 17 years ago, I got introduced to the mitochondrial world and it has become a passion for me and has led to some amazing scientific revelations for myself, starting from learning about the Mitochondria.

and also really has shown me the idea that perhaps the science that I do along with my colleagues, and by the way, I have to acknowledge that all this work is just not me.

There's been a lot of collaborators along the ways that have significantly contributed to what I'm going to speak to today. It's finally evolved to the area that, you know, I have to do things that can start to help people in real life.

Yeah. The real world doesn't care about a lot of the geeky stuff we do.

Why Mitochondria Became the Focus

So let's get be more pragmatic. And that's what I started with my co-founders two years ago, blew up

Neutraceutical. I'll tell you, learning continues, but I'm having a ball.

It is really so much fun. to see and talk with people like yourself and others to really get off the ivory tower or exclusivity of the scientific world and come to where it matters to people.

When science starts to interdigitate with the real world folks who are dealing with patients like yourselves all the time, this bridge, building this has been an amazing, amazing two years for us and I look forward to our conversation today.

Thank you. I do too. You know, I'm curious, maybe when we start getting going, how you ended up deciding to switch your focus to mitochondria. Like you said, you were exposed to a ton of things.

Definitely spent some time in the cholesterol world, it looks like. Do you, you know, how'd you end up deciding to shift your focus to mitochondria? I mean, like why?

And then, and then let's talk about mitochondrion. See, that's a podcast in itself, right? The reason is that I have to go into all the dredges that you go through as an entrepreneur, where investors come in and decide that suddenly they have the money and they know more than you do.

and start telling you, hey, wait a minute, I have the money and I'm the smartest person at the table. And you say, okay, great. You have money, you've got smarts, why do you need me?

Fair enough? So after I asked that question, the second time I said to myself, Sandeep, we can keep asking that questions or do something about it. I say all right, i'm going to do some thing about.

So I says adios and off I went. Nice. So you are in the mitochondria research, you meet up with your colleagues and you've been doing research for a while on this, right?

Yeah. So actually, just to add a bit more color to what I said, I got introduced to the Mitochondria in 2009 to some work coming out at UC San Diego through some studies clinicians were doing at the VA, at U. C.

SanDiego Medical School. And long story short, when I saw that data, et cetera, it just clicked in my head that clearly there's something here that is not explicable through normal modalities that we use in science and drug discovery.

happening that is unexpected, so wide ranging from biomarker responses to clinical responses, to readjustment of physiological issues. In my career, I've never seen a single intervention do all these things.

Nice. So this is not simply a pathway process, there's something more systemic going on. So that's the word systemic, systemic. And really taught me starting then on that we are so used to dividing our body into silos.

We forget that your heart is connected to your kidneys, connected your liver. And you notice recently in the last few years, suddenly people are talking about, oh, there's a gut brain connection and there is a got heart connection.

I'm like, wow, why is that such an epiphany? It's been there all the time. We have chosen to ignore it. The reductionist modality has not gotten us anywhere for 40 years.

And doing the same thing over again, how is it going to get us there? So this data set became my foundation to work with a lot of other smart people, very, And it became a passion.

And the more I learned, the deeper I went, and the exciting it become. It led me to the fundamentals of Genesis of life itself on planet earth.

Mitochondria as the Body's Sentinel

Love it. Man. Well, that's way different than, you know, blocking a receptor somewhere or turning on a receptors somewhere and doing a thing. You know?

This is, this gets deep. Heck man, even in my medical school time, you know, it's getting to be further and further away now, but we'll call it 20 years to nice.

You know the mitochondria was the powerhouse of the cell, man. That's just where energy came from. It was just a little energy plant. I'll tell you one thing, that word is used so often, But it is so much more.

And it wasn't even on my radar that it might do more, I know, right? And as the, you know you go through medical school, You go to residency, pretty soon you get a long ways away from the powerhouse, the cell.

You don't even think about it anymore. Like, yeah you should probably like take some B vitamins or something and roll. And then, all of a sudden it starts coming up.

Mitochondrial disease, mitochondrial health. So I'm super excited to see kind of where we're going because I've got patients that are like, man, cause I make a living.

as a direct primary care doctor, taking care of people who come to me saying, hey, my other doctor said that my labs look fine and I feel like crud, right?

Like, yeah, there must be more to this than a basic chemistry and a CBC and TSH and, you know, maybe an A1C. And you're like, yep, There's a lot more going on.

There is more than I understand for sure, but let's start opening those doors. and let's start uncovering those rocks because we've got fatigue and brain fog and you're just not recovering well, not sleeping, no energy.

There's so much to health and wellness that I think we're going to be able to dig into today. I can't wait. You're so right in all those fronts and redefining health and how we approach health.

We need to start thinking about healthcare, not disease care. Right. You need simply think that as you've said about your patients, you are not just the sum of your diagnostic markers.

and you go to clinical practice today and they read out, you're saying, oh, okay, not okay. Let's fix it. Okay, that's it and then here's a statin because you have high lipids and here is a pill because he got a headache and there's this, and that is it, so you are so right.

If you dig into it the whole idea of understanding evolutionary biology, how did we even come about as humans, how physiologically this whole thing developed.

Once you start asking those questions, it'll start to give you understanding and answers that you should be seeking for. Because that tells you that all these, I mean, humans have not been around for that long, but the role of the mitochondria has been for two and a half billion years.

Right on. Yeah. It's like the beginning. It is the beginning. I'll tell you today, this is so, I just had lunch today with a person who's been around in Silicon Valley and researcher, and he knew Lynn Margolis personally.

Lynn Margolis, she was the one that introduced the idea of endosymbiosis, which is the genesis of mitochondria in current modern eukaryotic cells. She introduced that concept.

By the way, for which she never got the Nobel Prize, that's another story for another day, but I met someone who directly knew her. I feel so good because imagine now suddenly I have a one degree of separation from one of the persons who actually re stated the aspects of evolution.

It really said that what we think about genetic evolution as the core is missing the whole point because genetic.

Evolution is so slow. Yeah. It can't lead to what we have today.

Something faster, swifter happened. And Lil Margolis' idea of endosymbiosis and bioenergetics and cellular energy, study starts to explain how just within two and a half billion years, we had the complexity of life on planet Earth.

You know this, and perhaps this is for your audience, that every living species on Planet Earth Everyone, the one thing we share in common is the mitochondria.

And so get into some of that terminology because, you know, The listeners aren't going to have any idea what you just said up to that point. Right. Sorry about that.

You know. Yeah. I know where you're going with this, but you are a better storyteller than I am already. So I like, I, like. so explain that out a little bit.

So, the idea goes that how did mitochondria… So it's kind of a present understanding and going back to explain how it happened. So the fact exists today, as you mentioned, we all talk about mitochondrias as the powerhouse of the cell.

Well, it is a power house. What I call it, is the sentinel. Okay, it is the one that keeps your cellular function at balance. It's a healthy phenotype.

it recognizes when the energy deficit, what proteins need to be made. I mean, ask yourself, when you exercise, What tells the gene to make muscle building protein?

What tell the Gene to stop it? The machinery is there. But what guides that machinery to start and stop? What is it? It's the mitochondria. I didn't know that.

It is the difference between a living body and a dead body. The dead bodies still has all the architecture of a live body, the all biological structure.

So that, you know, cause we talk about epigenetics in this functional space all the time, right? Like we all, your DNA is there all time. And if you do these bad habits, it turns on these genes.

If you these good habits it switches and turns these other genes and the it that we are talking about, I guess this flip in these jeans on and off is the mitochondria.

There you go. Because I, you know, sometimes you have to be like a three year old, okay, You have go to bed. Why? Because it's good for you. You see what I'm saying?

Right? So we get into the modality of say, yeah, epigenetic changes, why? I mean, and the idea here is that because epigeneatic changes are guided through external cellular stresses, internal cellular deficit, it is the mitochondria that's managing it.

So there's so much to unpack about the role of egos. But going back to the question you asked, the hypothesis comes in that if mitochondria is so universally present in every living creature, including plants, Yeah.

Right? The difference between plant and us is that we have a different genotype, but what is common is the mitochondria. So how did this organelle that exists in all of us happen to be in All of Us?

And the idea here is what Lynn Margolis proposed was a concept of endosymbiosis, and that unicellular things would phagocytote or eat other unicellular things.

Okay. For food. That's what they did. Yeah. Bacteria, all those things Yeah. So what happened was, hypothesis goes, that about two and a half billion or 2.3 billion, give or take a few hundred million years, there was an event where an ancient eukaryotic cell engulfed a prokaryiotic cell, a bacteria cell.

And instead of the bacteria cells dying, it survived. The bacteria's cell's waste product, which we now call ATP, was the energy for the eukaryotic cell.

Now, that is endosymbiosis. They created a symbionic relationship. Hey, I'll take care of you. You take of me because I'm living inside you, so I am protected.

Okay. I have bacteria. Because mitochondria have their own cell wall. Yeah. Yeah, all through school you think you have the nuclear genome comes from the father and comes for the mother half and half mitochondrial genome Comes only from their mother And it's not a helical genome.

It's a circular genome Right like a bacteria like bacteria and etc. So it has all the function structures of a Bacteria it just living in you Right? Yeah.

That's it. And so over the years, or millennia, I shouldn't say years.

Endosymbiosis and the Origin of Life

I mean, we should talk over many millennias, ATP that this bacteria was doing, producing, contained an energy function. What the bacteria were doing when it was processing food, that food processing the product became ATP, the ATP was packed with energy.

Yes. Physics energy. So this is in that process. And when this energy went out to the eukaryotic cell and the ATP split into ADP and inorganic phosphate, it provided tremendous energy to system so that it could survive and it would evolve based on external stresses and stimuli.

So suddenly, it's like the same thing. You are in a castle and you have lots and lots of ammunition, you can defend yourself better. Yeah. Well, you know, for the listeners, like ATP equals energy in your body.

Without it, You have no energy. So when we say this thing's putting out ATP and it provided some energy for this system, your, our whole existence depends on being able to create ATP, which You know, all the different diets out there all about feeding your body differently and adjusting the way that it makes energy, the Krebs cycle and all these things.

It all takes place at the mitochondrial level and, and adjusts how your. Yes. Makes energy. So, so when you make more energy you have more, you know that you feel that your, body works better, your brain thinks better you're, You're sleeping better.

You are being a good, healthy person. Right. It's just night and day. In metabolic, you know, that's why it's called the powerhouse of the cell in your eighth grade biology class is because it makes ATP.

And then also that is how everything works. So a healthy mitochondria… So I want all your listeners to think about it as a sentinel. it is the reason life exists.

If I take a mitochondrial out of a cell, the cells have no way of making mitochondrion. Yeah. Right. That's how important this thing is. Because the mitochondria, is the Mitochondria not the proteins and everything that makes the mitochondri?

Is it not coded in the double helix DNA at this point? Yes, 99% of it. Okay. But it's the 1% that sits in, the mitochandria controls it Okay, okay. Yeah?

Okay! Is that m- Yeah, powerful, isn't it? This little bitty thing tells your genome what to do. Genes are not the blueprint of life. People have you believe it.

Okay? Look at it, since the decoding of the genome, human genome with all the grand hoopla, what have we gotten? We know why you get a disease. I can tell you that.

But what does that mean? Great. Salip, you have this much, are you going to die? Well, I know that! The idea here is that look about the ATP, the production of ATP.

I can't move my hand if those muscles at that instant didn't make ATP." Okay? And I could go on and on, Clint. This is just such an amazing story. And if you believe in God, whatever your definition of God is, mitochondria is your God's particle.

Cool. I mean, you could go all the way back to where did that bacteria, that ATP producing bacteria come from and wrap it up, man. But I love that that's the origin of the passion and your desire to just keep finding in your research world, the thing that has this outcome that so much bigger, so systemic.

We've got cardio metabolic disease, neurodegeneration. autoimmune, other inflammation, you know, what role does the mitochondria, I mean, how does a mitochondrion affect all of that?

I think. So let's start with your last one, inflammation. And then now we talk, we have a new word for chronic inflammation called Inflamagin. Well, great, so now you have another word.

Mitochondria control inflammation When you have an infection or you haven't any other result, when you cut your hand, you burn your hands, whatever it is, the mitochondria senses the stress and immediately sends out the troops.

The troops are these cytokines and interleukins from your inflammatory pathway. It senses what the disease or what insult is and boom, it fires these things.

The mitochondria control it. How does the mitochondrion control the inflammatory markers? Because it is through the protein called NF-kB. Because the Mitochondria sense the cellular stress, lack of oxygen, lots of glucose, fructose.

It is sensing something is not right. And the moment it says something is not right, it will induce changes in its function to address it. And one of the frontiers is it tries to protect the system by putting out these inflammatory systems.

Inflammation is necessary for health. This is how you fight disease. Yeah. It's how you heal. Exactly. And the mitochondria controls, you get the flu, right?

Your mitochondrion induces the inflammation, your temperature goes up, it's up for three days. it is inhospitable for the virus. The virus load is gone and the Mitochondria brings the temperature down.

Yeah, yeah. the problem comes in when you keep getting the flute again and again, and Yeah. This acute phase becomes chronic. So your mitochondria are constantly on the alert and that alertness costs the mitochondrias capability to be effective because there are damage.

See, when you're in a battle, It's not just one-sided damage. You are also damaged, so your mitochondria get damaged. And then, and we can hopefully come to this, is that you're not physically exercising to replenish the mitochondrion.

So you come out of being sick, having dealt with the battle, and you're tired. It takes you a few more weeks to come our days to calm out the constant.

Your fever is gone, but like your patient you said, they still feel terrible because their energy has been sapped. And it takes the body time to rebuild that capacity, the manufacturing of the mitochondria, till it comes back.

And, it's that phase of replenishing the Mitochondria. The rate at which it goes is the recovery period. Okay. Yeah. If that recovery is not fast enough, you never come up, but you sit a lower plateau.

Yeah, because you got your next insult coming. But even with the current insult, Clint, the idea here is that mitochondria have a half-life. You're constantly losing mitochondrion.

Your body has to make more one. So it's not like you have mitochondrias for the rest of your life. It's like the heart, you've got it for rest your of life, it keeps every cell gently.

Imagine in a situation you're using mitochondrial energy to fight off the infection. which is an extra curricular activity that the mitochondria normally do.

So that deployment of energy has to mean at the sacrifice of something else. Yeah. You sap your physical energy. That's why when you have the flu, you can't run, Bah, right?

But because you're not doing it, you are using your reserve mitochondria, and you aren't making new ones. Now it takes time to recover the new one.

Inflammation, Aging, and Energy Decline

Imagine if this is a chronic disease, your on a spiral down, because by the time it comes and it goes down again, so you create a new lower plateau, then a newer lower plate, till your body just gives up.

Yeah, no, that makes, perfect sense. And you know, part of the reason why little kids bounce back so fast. You know? They've got this pristine system.

Everything's at its best. Not more mitochondria per cell. Because starting age 21, you start losing 10, 15% of your mitochondrion every decade. Wow. Okay.

That's happening. That's called aging. What happens at 21? You can eat what you want, but you don't get weight. You eat the same pizza when you're 31, and suddenly you are heavier.

At 41, it's worse. And you go, I'm eating the the, what the heck am I gaining weight? It's because your metabolism is slowing down because you mitochondrial function is going down.

Yeah, right on. Just imagine when your metabolism slows down, your energy goes down. Your physical activity goes, so your mitochondria goes on even more.

It's like this vicious feedback loop that goes and on, and what do you do? You lose your grip strength, you lose you metabolism, as you age, suddenly cognition, etc.

Right. Well, I mean, what, you just implied to be true, but it's worth saying out loud is that exercise and physical activity and movement drives the need for more energy and therefore your body makes more mitochondria to replace them, which is one of the reasons why, exercise matters.

And you know, your strength, you're grip strength directly correlates with your life expectancy and all the things. Exactly. Because see, if your grip sense is good.

then the rest of the body's bioenergetics is good. And why? Because the mitochondria make a decision of criticality. They said, if I have only X amount of energy and I need to X, I want to spend X for more critical functions.

So I will let go of their grip strength because that's not so important, but I would protect the heart and the liver and kidney and brain. But as this deficit goes down, it starts affecting rest in the critical organ till one day you're no more.

Well, and you get to the point, the brain is this energy sucking device. It just needs so much energy all the time. 2% of your body weight, 20% off its energy consumption.

Really? That's a great stat. Yeah. I mean, and that's why it's so hard when you're tired, like, you know, those times when like hey, I'm going to pull an all-nighter to study for this test.

And then you sit in front of that test and you like I should have gone to bed. Like I can't think. Yep. Yup. There is a reason for that too. If we have time to go there today, but there's is very clear reason why if you don't sleep well, Your next day is terrible.

Take a red eye from the West Coast to the East Coast, and you're suffering for the rest of the afternoon, right? Yeah. And there's reason for that, but there are so many interesting things I could tell you.

For example, I told you that the mitochondria is a bacteria. As you said, it's generated by exercise, The question I asked, how and why? And nobody could tell me.

Nobody could me what happens when you exercise that leads to making of the new mitochondria. And that's what I figured out. So we figured that the mitochondrial make a specific steroid.

We're the first ones to detect this human steroid. It's present in humans. And I said, if mitochondria is present everywhere, is it present and rats? Yes, it is.

Is it president in mice? It is, present it in worms? Right? So with exercise, when you exercise your mitochondria sends this signal to your cell that I need to make more energy.

And it tells the nucleus, make your more mitochondrion in the absence of cell division. It's the key. Because when your cells are dividing, they will make mitochondrias so that two daughter cells have the same number of mitochondrial.

But your are not dividing. and it needs more energy to function, this steroid is the key. And we've shown this and we have found it in humans and, we're shown it's mitochondrial function.

We have shown that this is what it does. This is where we are going then. So this conversation is going to be about that steroidal, yes? No, whatever you want.

Whatever you wanna talk about, but I'm telling you, there's so much to unpack. So this is key. Suddenly we have a reason. To all your listeners, this why you exercise.

You exercise so that your mitochondria in the cell that is exercising makes more mitochondrion to deflate the deficit. But the amazing thing happens is this steroid then goes through your entire body.

And it elevates your entire body cellular function. That's why when you exercise, your brain feels better. Yeah, right. It's your legs that are doing the work.

Why is your braing feeling better? Because we have shown that this steroid goes to your whole system within minutes. Fascinating. I've met so many patients that when they hurt themselves, I worry about their mental health first.

Because they can no longer exercise like they need to, to keep that balance, there's such a delicate balance. So good for you. And most clinicians says, oh, you've got cancer.

I could care less about your brain. Right. Yeah. If your is in a bad shape, yes, it does affect the rest of your body. It does effect, starting from your, quarterly exam at the university the next day or your interactions at office or the health.

By the way, we say you go to sleep to rest. What happens is quite the opposite. As a matter of fact, your brain uses the most amount of energy when you're sleeping.

Well, I mean, you know, it's active when you dream and you got REM sleep. Exactly. And that is important because during the REM, sleep is cleaning out the debris.

It's making new, new connections, solid connections during their day. and people have shown this. it'll make rapid connections for you to function. At the end of the day, it will get rid of that irrelevant duplicate connections to conserve energy.

But to do that, It needs energy so much so that when you are in your REM sleep, the rest of your body is in paralysis. Right. The body's, The brain is consuming its entire energy production.

Yeah, that's cool. Yeah, that's great. You know, which is, you know your body is resting, but your brain's working its little tail off. And so as we age, we don't have enough energy to go into REM sleep, get into the zone of neuroplasticity, not be able to clean our brains, Not able clean neurons or neuronal connections, lay down shorter memory.

and of course the outcome is clear. You're always tired. Once you get older, you don't sleep well. You can't remember things that just happened two days ago.

So, I mean, so many things going on in my head right now. And so if you go to these, if go A4M or you to functional medicine conference and you start like, no matter what the lecture is about, it could be, gosh, the neuro guys, that metabolism, everybody, they all say the same thing, man.

It's about. exercise, it's what you eat, whether you're sleeping or not, how you handle your stress. It all comes down to basically those four pillars, throw in a couple other things.

That's basically what we're talking about today for this mitochondrial exercise. You've got to feed it, you need to exercise to sleep. Go for it. Here's something I want to tell you, which is Exercise and nutrition are the hallmarks of good health.

Fair? Don't eat processed food, stop get out of sugar, no donuts on Saturday mornings, etc. You ask the question why? You know, get back to your three-year-old mentality.

And it turns out the answer is not that complicated. Exercise we all have agreed is the one that makes the mitochondria. Think of it as the furnace of your body.

It's the furnace inside because it is the one that provides all the energy, the heat that the body needs. The nutrition is fuel. Right. Mitochondria cannot do anything unless there is a fuel in their Krebs cycle.

Where does that fuel come from? It comes from the food you eat. You can't just shove the tree into a fireplace to burn it. You got to cut it down to bite-sized pieces.

That's what the microbiome does. Yeah, right. So nutrition is good because it allows the microbial, which is now in your gut, outside your body to take the food you eat and turn it into food that the mitochondria can use.

And that makes sense. I mean, we've got, I think on one hand, technically mitochondria use glucose to make. It all comes from the food. Right. No, it's like you eat the donut, you know, in theory.

So it uses glucose when you start exercising for the first 30 seconds to a minute. Really? It really likes to eat, digest fat. Yeah. Ketones. Yeah, or ketones are product of fat metabolism.

Right. Okay. The keto body comes because of the fat being metabolized to ketone bodies. So it's initially you want to have a quick fire. It's like softwood.

If you put soft wood in your furnace, it'll light up quickly. But it doesn't give you long-term heat.

it will burn off very quickly, the long term heat is from the hardwood, which is the It takes longer to burn, but when it starts burning. So what happens in an energy cycle is as soon as you start running, the first minute or so you're burning glucose because it's there, it is rapid.

Now for the brain, its different. The brain is only glucose. It doesn't like fat because its hard for fat to go through the blood brain barrier. But the rest of your body, it burns glucose, but as you keep burning it switches to fat burning phenotype.

That's why when you exercise, you can't just go exercise for 30 seconds and say, I've done it. You've got to do it for the duration to kick in the fat metabolism path.

Now your body will generate ketone bodies, ketones bodies will go to the brain, you will make the steroid I speak about, and the system starts to rebalance up, feels good.

Yeah. Okay. So let's talk about this steroide a little more. I mean, surely your product is this. You're dancing. No, no, I will get to that. Let's do that, so the product we put out is a natural product.

that mimics the activity of the steroid. Beautiful. So now we have a product that directly has the mechanism that is innate and natural to your physical self.

It's nothing unusual, nothing artificial. it is how you would naturally make mitochondria and this understanding allowed us to come up with a or whoever, you know, take this because it has the mechanism that your body naturally knows.

Hence, it's has its natural controls. Right? You and I have a phenotype. I'm not going to ever build Arnold Schwarzenegger muscles. Right. Because my genotype has a hermetic control on my cells.

This is cellular hermesis. So when you take this product or you bring the steroid through exercise, you will only go so far that is optimum to your body phenotypes.

So this product, that natural product has a natural break. It will complete and fulfill your need. And when you've reached your cellular hormesis, it just sits there, doesn't do anything.

Until you go down, the kicks in again and brings you back up. Till you got down kicks it again, and it brings your back out. So that has self-control and has great role in safety.

Now we have a national product that's been in human diets for 5,000 years. Okay. And a mechanism that has been in humans for, well, at least in, humans, but in animals for over a billion years.

Right? Yeah. So you're talking about a safety parameters that are clear. It's not something you take and say, oh, by the way, Your gut may go crazy or you may have headaches or even do this.

No, this is a product that you give and you take it, you feel better. And if you, it's your, your body will respond. It's like, if your exercise a certain way, Your body would respond to your phenotype.

If I exercise, I will response to my phenotypes. It's the same concept as peptides in general, right? Where you're giving the body something it already makes.

You know, most of those are working within the bodies natural minimums and maximums. So you can take all the Tessamorlin you want, your body's not going to make more growth hormone than it wants.

But by the way, that part you just said, last part, is not controlled by peptide, it's controlled the mitochondria. How did I know that's where you were going with that?

Like a broken record, I keep going there. No, but you're right. The premise you are stating is correct, that when you tap into natural body processes that have natural-body phenomenologies and controls, and then you use something that is safe, the worst it can happen is it doesn't work.

Yeah. I mean, and you waste it. That's it, you didn't need it? You know, everybody's like, Hey, is NAD good for me? I'm like I, You would love N. A. D., I am sure.

Like, if you are low on N A. D., then it's going to make you feel a lot better. A hundred percent. If you're doing pretty good on an A D. You're not going feel that much better, but it is not gonna hurt.

Right? So that's where it is. You can't, you're not going to get through much of that. So one of the things is I say to people that, and it's not because I'm tooting my horn, but the thing is creating the essence of mitochondria, more of your sentinels who are now ready to protect yourself.

Right. It's the key. Okay. I agree. And to me, if you can do that, you will be better. Anyhow, go for it. That's what I mean. Inflammaging, inflammation times time equals aging.

As you age, every decade you lose, what'd you say, 10%? Yup, mitochondrial content. Of your mitochondria, right? So why do we feel bad? Why is everything harder?

why, why did we start losing our mental clarity over time? It was because we were losing mitochondrion. If we can slow the rate of decline, if we could increase back up to a reasonable level, I mean the immediate quality of life impacts as well as potentially quantity of live impacts.

If your grip strength correlates with your life expectancy and you get more grip strengths, then you just gain life expectancy, right? It's a pretty common sense, it's common-sense piece.

And that's why we used to think exercise was important, but now we know that exercise is like 10 X as important as we use it. Well, you got to burn some calories.

It was like, no, It is not that it is everything else. Exactly. So true. And I think that if we, as a community, society, start to re-emphasize the role of the two bacteria bodies, basically, we have more bacteria in our body than human cells.

Okay? Yeah. I mean, you have like 100,000 trillion mitochondria. Right. If you count the mitochondrion, it's not even close because you've got so many- And then you talk about the microbiome, which is another.

So the rule is, if you keep the bacteria body happy, Yeah. And you will be happy. Yeah, so eat well, eat and exercise. That's right. Because if mama ain't happy, nobody's happy right?

The bacteria ain' happy nobody. Exactly. Well, how do we, so your product is, does it have a name? Is it available? How do you go about taking the next step?

So it's MitoCatalyst E, E for echo or for the after, you know, and our website is BlueOakNX. Just like the Blue Oak in California, which is a very rare, sturdy, wonderful oak.

Blue Oak NX, all one word. Okay. Dot com. Yeah. And also you find a lot of literature, but please also, I always say an educated consumer is always the best.

Yes. Whatever you take, please educate yourself about the mitochondria and about them. It'll tell you why exercise and nutrition is so universally healthy.

No matter what else you do, take whatever you But often you cannot exercise and perhaps these supplements that we have created or whatever people are doing may help you and so do it.

And my team's work and the other collaborators I've had it, we are looking at it and we're continuously clinical studies by the way, Clint. So we right now have six of them going all over the globe.

from the Karolinska in Sweden to University of Glasgow to Stanford to Children's Hospital Philadelphia to… I mean, so at UC Davis, and we're looking from everything from fat deposit in the muscle to frontal lobe dementia.

The idea I always believe is that as much scientific validity and data you can collect. So when we work with our clinical colleagues such as yourselves, we always say, whatever information you gather, because this is a new paradigm.

Right? That we create, and here's the power of it. Think about it, that if we collectively, as a group, start to accumulate this bio-energetic responses in patients, then we start analyze it perhaps through machine learning.

It would start to give us a picture of what are the parameters you can measure to really ascertain the bio-energetic profile of that patient. As a primary physician, you do the CBC.

What do you do the CBC for? You look at the whole profile. One can start to create a bio-energetic profile, and how do create that? Because it's a phenotypic response by accumulating a lot of information from different patient groups and then saying, okay, if this is your status, these are the markers that we have seen respond.

Perhaps that's what we look out. Yeah. Because at the end of the day, I'm not averse to analyzing systems, but they have to be analyzed on a platform that is meaningful and give the information that it's usable.

I mean, sure. Yeah, because we've been, you know, a hundred years of. pharmacology telling, look at these biomarkers improve. Right. And you're like, great, but the patient doesn't feel any better.

But if you get on it for the next 40 years, they're going to live longer. Like, okay, will they live well longer? There's just so much more to the picture than that.

They just be sleeping on bed and in their bed, and breathing, right? Right. No, they're alive. There is life expectancy, but no health expectancy. And so moving in the direction of health and wellness and quality of life.

I know so, much, more about how the bacteria uh, the mitochondrial part plays in this. That's so much more fun. It's going to be so useful for me when I'm sitting in front of a patient talking about exercise and diet.

You know, we, I want to take you on a little tiny little trip here as we kind of get close to the end, but we have these devices at my office that they're magnetic waves.

Okay. And so we use them for muscle building and they have, they, have got, They've got a lot of things, Ultimately, what used to be aesthetics turned into functional.

MitoCatalyst E and Clinical Research

purposes, like say the Inscult Neo. It's like, well, you can treat your abs, but your back feels better or your, why do you, we feel like you exercised.

Why? And then as we, as, got into it, it's really about the magnetic wave. it activates the mitochondria. Even more than just the flexing of the muscle activates, the Mitochondria to the point that they have one that we now put on the scalp of a patient right over the left prefrontal cortex.

And it just. Depression, anxiety, migraines, OCD, ADD, it's just turning on the mitochondrial processes in that part of your brain. And then it releases things that tell it to make those nerve connections you were talking about, right?

The BDNF and all the things. Yeah. That go into that, I'm sure controlled by the Mitochondria. Yes. And then it's amazing what mitochondrial stimulation will do to the mental health of someone.

Exactly. And what you're saying is very true because the mitochondria function by creating a membrane potential. Okay, so they accumulate. So you can imagine there's an electromagnetic component to the mitochondria.

Look at this applies to meditation, this apply to chi, go to ancient philosophies, aligning yourself, how they talked about that. Grounding. This is what it is.

Your body is in sync with the Earth's bigger magnetic field. There is a sense now that we all have a magnetic field aura and now we're getting into this ethereal conversations, but it is important when you sit next to somebody.

Your bodies are not touching, but your bodies have an interactive phenomena. And you know why? If you take the mitochondria, it is so small, like five nanometers, and the membrane potential it creates, if you were to define it based on that surface area, It is the intensity of a lightning bolt.

Wow. For that little bitty thing. And it is creating billions of time, not millions, billions, of times every day. Yeah. And is it creating this magnetic field of its own?

It has to, because that's part of physics. Whenever you have charge separation, that is how you create. I mean, if you look at your battery, right, has a magnetic feel, there's a positive and a negative, it's creating the charge separate.

So what I'm trying to say is that absolutely. And it's been nuts watching these devices make people feel better all over and start it. Like, so, you know, it was, at first I was like, okay, if I put this on somebody's shoulder and we're, I'm getting off track, but I'll come back around.

But if you put it on someone's shoulders. I can see why, if you do it enough times, it stimulates healing and you get more elastin, you'll get it more of these other things, collagen, these are the things in there that stimulate healing.

I could see, why it would feel better in a month or three months. But why does it feel, better today? Because now, one of the thing I'll tell you, sorry, whatever it is, first question say, is the mitochondria involved?

Yeah, that's right. That's it. Yeah. As a scientist, I will never say 10 out of 10, but as a person who studied this, i'll tell you nine and a half out 10 times that if you go down that rabbit hole, that's where you'll end up.

Yeah, it's still great though. But well, it's so great that we're, that like folks like you, the functional medicine guys that are pushing in that direction, um, That are bringing to light the, I guess, really the complexity of the human body that We've been ignoring for ever.

And then this, what you've got going on is the beginning of hopefully an industry of opportunity for mitochondrial health and wellness times time, which equals humanity, health, and well-being times.

Okay. That is it. So that's what keeps me excited. And when I get responses from even one or two, we've gotten a lot where people say my life, is normal, as normal as it has ever been for the last 10 years.

It gives you purpose. Yeah, it does. And remember, the idea here is that when you do things, we're still a business. We have to be a businesses. we have survive.

But we are a public benefit corporation. And my partners and I, founders, we decided that we're going to do it in a way where, yes, it should be a really good, successful, thriving business, but we should always keep in mind that, well, take it and hope you're gonna get better 10 years from now.

Oh, and by the way, I'm treating you for depression and you may have suicidal thoughts. I mean, that is the funniest thing I see on commercial TV when pharma adversizes an antidepressant and says, oh, by the way, you may have suicidal thoughts.

I means, in a lot of ways, it's a new world for me and it has been amazing speaking with clinicians directly about the

world they have, they face. And that interaction between that world and the research I do and I speak with them has been really rewarding and keeps us going.

It does. I mean, I tell you, the reason I'm doing direct primary care, or the reasons I am spending time with patients and walking life with the patients is because it just wasn't any fun.

But also, you cannot just simply in good conscious tell people that I'm really curing you or helping cure you. Because all you're doing is kicking the can down the road.

You're just slowing down their misery to the final conclusion. Right. Well, and there's that, right now, I think the average is about eight plus years of difference between life expectancy and health expectancy as it is.

Yeah. And as a physician, in a way, before this opportunity to like learn and spend time with patients and get outside the box. I mean, I'm basically a drug dealer, right?

Like all I had to offer was another pill. That's it. And so the, these last, you know, 10 years actually of practice, it's a big landmark for us. Well, congratulations, a decade of celebration.

Yeah, we're going to party at some point when we have a breath. Just make sure there's an invitation for Hey, we're going to need a lot of energy. Just kidding.

That's why we do what we, do it's more fun. It's so rewarding. One of the things that I missed 10 plus 15 or so years in the ER was that. patient doctor relationship that, that getting to see the good outcome, like in the really big, bad emergencies.

Yes. There's some satisfaction there, but most of what I was doing was patching them up. Yeah. Just pretending, just saying, yeah, follow up with your PCP.

It'll be all right. So, uh, it's, Hey man, It's been so good talking to you. Thank you so much. That was so educational. Wonderful. I enjoyed it so much, every bit of it, because I really like these kind of the way you do it.

These unscripted. Let the conversation evolve, you know, Because in that lies good substance, You know? Because it's not orchestrated. So thank you again for the opportunity, allowing us to speak through you to your listeners.

And I hope that at least this is going to help them as they think about their health. Listen, for the percentage of the conversation that the average guy could even keep up with, and we did a pretty good job of keeping it simple, but this is going to be super eye-opening.

And tell you what, I'll let you know how it works for me, because I want some. No, please, let's talk. Absolutely. Because I have to tell me a cult pop.

I take it too. Oh, there's no way. If you don't, I don' want any. No, take it. I've been taking it for two years.

Closing Thoughts on Health and Wellness

Okay. And one of the things I always see is my endurance capacity. Yeah. This is not for your listeners necessary, but I go to the gym and after two hours I simply say, okay, i'm done.

Man, let's go. My trainer's not going to know what to think. That's awesome. Anyhow. Thank you so much. We will, we'll put all of that contact stuff into the show notes because people are going to want to click on it.

I know they will and we will be in touch. There's so many more. Love that you're 40 years into this and hungry to learn more, I can't wait to see what else you guys figure out along the way.

We'll be in touch more because I'm going to have to let you know how it worked for me at least. Yeah, absolutely. And happy to. Anytime, anything you want to talk to us about, please reach out.

Unfettered because, I am still on this journey on learning and learning, and it is just an amazing one. So thank you again for your time. Thank you for giving us the opportunity to speak with you and your listeners and wish everybody the best health.

That's great. You have a great night. Thank you, sir. Bye bye. Thanks for joining me today on My MD Unspoken. I hope today's conversation opened your mind and inspired you to imagine a better path for your health and therefore life.

If you found value in this episode, be sure to subscribe, leave a review, and share it with someone passionate about transforming healthcare. Real change starts with real conversation, so let's keep on going.

Until next time, stay well,