Mitochondria The Key To Your Healthy Brain

Cheng Ruan, MD
with Anthony Capasso, MD

Cheng Ruan, MD
Today we have Dr. Capasso who's gonna dive into this concept of mitochondrial health. Now the mitochondria is what makes the energy in all of ourselves and actually the brain has the most mitochondrial density for any part of the body and that's why it's so important to optimize this thing called mitochondrial health. So I'm gonna dive deep into today with Dr. Anthony Capasso. He attended the Ohio State University and graduated cum laude in 1987 with a Bachelor of Science. He received his doctor in 93 from the University of Alabama at Birmingham. He completed his medical residency, Internal Medicine, University of Florida and his board certified in internal medicine and he has been working at the University of Florida. Jackson was associate medical professor but then became one of Jacksonville's top physicians and featured in multiple magazines and expertise in preventative medicine, H management, nutrition positive hormones. And then in 2009 he was voted the # one physician in Jacksonville Beach, which is really cool and he is a speaker at metabolic medical institute, American Academy of anti aging and just a huge medical visionary and he's a visionary behind the Fin centers, M. D. S. And weight loss programs and products and protocols. He's also the director of Integrative Medicine. Finn MD Medicine Ball and host of the top health doc's podcast. So without further ado I'm going to introduce Dr. Anthony Capasso. Well welcome to the show and thanks for being on here with us at the better bring out some of it.

Anthony Capasso, MD
Thanks for having me

Cheng Ruan, MD
we've been throwing around this word like mitochondria for a lot of other interviews already and there, you know, there's a sort of big black box into what it is, right? So we know it's part of a cell that like generates energy. Right, But how does that really relate to bring health in general?

Anthony Capasso, MD

So, you know, it's it's a lot more complex than I initially thought when when I started studying mitochondria in mitochondria health and you know, way back when we learned it was the powerhouses of ourselves and it's, you know, the place that produce energy. So it allows our body to take our carbohydrates and fats and proteins and break it down to produce a T. P. To kind of you know, make things work. And what I realized after I started reading more and more, it's really like the brains of ourselves because it senses the cells environment and it will tell the cell to do particular things. So not not only does it produce the energy, but it also is involved with regulating the cellular function. And when you start looking at the brain and realizing that, you know that each neuron has up to two million mitochondria in it. It's one of the most densely mitochondria organisms in our body probably next to our heart. So even a small drop off of energy can reduce the power in order to make new memories and those types of things.

But as I started to read more and more on the mitochondria. What I realized is that there are several things that can occur inside the mitochondria that can affect how the body works. And this is kind of that double edged sword that I talk to my patients about because you know if you've got healthy mitochondria you're gonna age much slower, you're gonna feel great. And we know that virtually all diseases especially the neurodegenerative diseases or some form of mitochondrial dysfunction linked to it. And the question is, is it purely just an energy issue? Or is there other things that could be going on? And one of the you know the double edge is when our bodies in the mitochondria specifically are burning carbohydrates they produce buy products we call reactive oxygen species are these free radicals. So if you're eating a diet that's high in carbohydrates you're actually producing more byproducts that can injure the healthy mitochondria and the cellular function.

So and we've known that for a long time. But the thing that really really opened my mind was that our mitochondria has its own D. N. A. So not only do you have D. N. A. You know in your nucleus but you've got D. N. A. In your mitochondria and there's 37 genes in this packet of D. N. A. And so you can get DNA mutations in the mitochondria. So mitochondrial DNA mutations which can affect brain function I mentioned the reactive oxygen species that are produced by the mitochondria which can injure the neurons and and do that. And then there's also how the certain proteins are folded or misfolded and aggregates that can affect that function of mitochondria. So you know a little more complex than you know we were initially told way way back when. But as you start to do a deep dive you realized how important you know that mitochondria is and especially the mitochondrial D. N. A. And the thing that really really made me focus more on mitochondrial for brain health was the fact that any type of stress whether it's

environmental stresses whether it's or environmental toxicities. Whether it's mental stress can cause leakage of that mitochondrial D. N. A. Into the cell. So head injuries we know will do that. We know that a stressful environment will do that. We know that medications will environmental toxins will. And so what's the problem with having your mitochondrial DNA leak into your cell is our bodies don't recognize that D. N. A. As ourselves. It recognizes that kind of as a foreign player. So we get these really strong inflammatory responses. So part of brain injury could be occurring from the fact that our healthy mitochondria which power ourselves are now releasing you know small amounts this mitochondrial D. N. A. Under certain circumstances which can really trigger that inflammatory response causing neurologic injury And then you know the disease of cells and the neurons.

Cheng Ruan, MD
Now this is interesting because in transplant medicine we know that organs that get transplanted into people have a propensity of being rejected by by the host or by the person. And we also know that the mitochondrial D. N. A. Has its own effect. And what essentially happens and this you know call it a spiritual thing. But there's a lot of cases where people are also inherited some of the memory of those mitochondrial cells. And so there's a physiological change in the person who obtained the transplant that's similar to the actual host and even dreams and memories as well. This is really well documented. And then another really interesting thing about it as you're talking about it is that we know based on a lot of like the E. G. And the quantitative eEG. Studies that we do that psychological trauma looks a lot like actual physical concussive injuries when it comes to electrical patterns of the brain.

It's very interesting you say that you know it doesn't matter what stress it is. As long as there's stress that could be sort of this leakage of this mitochondrial DNA into the system and then her body has to like accommodate for that. Right? And so that that stressful response has a there's a mechanism that's built in. And because we get the mitochondrial mitochondrial D. N. A. Inherited what we used to think it's only from the mom. There's new evidence is actually from the mom and the dad. But we used to think it's from the mom's side and its multiple generations up. So our mitochondrial D. N. A. Is ancient, you know and it probably predates humans actually. And so we come from this sort of this lineage and we have this thing called mitochondria but it is at the root of brain health, which is what's so fascinating of what you discussed. So how do you how do you tackle this? I mean this is sort of complex subject, right? How do you tackle this from like a clinical aspect? Yeah.

Anthony Capasso, MD
Yeah. So you know the most important thing, you know, especially when you know when you do more of a functional practices really make sure that people are balanced because sleep is very important. You know the most if you're not sleeping this is what I tell my my patients is make sure that your sleep is good because that's the time period that the mitochondria in your cells are kind of shutting off the top Fiji occurs Mitofsky occurs and you need to repair all those things for the brain to function properly. So just you know, good sleep. Probably one of the most important things that I'll tell my patients, we have to focus on getting that sleep process good but hydration, managing your stress, making sure that your diet is full of colorful vegetables and not high in in carbohydrates you know so you know that that lifestyle balance I think has to be there at the front end otherwise no matter what you suggest or or those types of things that won't work. And you know I kind of look at brain dysfunction in forms of, okay well what are the things that protect your mitochondria? Right.

What are the nutrients that we need to protect the mitochondria? What are the things you know in regards to bio energetic sex that can help support mitochondrial function And you know what are the healthy fats that the mitochondria use? Right. So I think about omega three fish oils. I mean there's a lot of studies with the omega threes and the protective benefit I think about fossil lipids right? The lipids that are that kind of you know envelope the neurons that allow nutrients to come in and out. fossil title choline fossil title searing fossil title ethel aiming. So you know diets that are high in sunflower seeds for instance could be a good source of fossil lipids. And then you know other things you know when we know that the brain primarily functions on either carbohydrates or ketones if you're not having carbohydrates and it's a much cleaner process with ketone as being the you know the major source M. C. T. You know the one of the fats that's found in coconut oil. I found it to be great from the standpoint of you know kind of mental clarity and energy. I don't know if you've seen that or not

Cheng Ruan, MD
Definitely. So let's rewind a little bit because I guarantee you the people who are taking notes on our talk right now are writing down the supplements but they don't write down that I need to sleep more. So there's a hierarchy right? There's a hierarchy to this. It's not like you eat well and you take supplements, everything's good. There's definitely a hierarchy. And you know what you said first right off the top is sleep, sleep frustration and stress right? Which does not require you to pull out a credit

Anthony Capasso, MD
card pretty much pretty much. And I mean it's it is I can tell you right now you know the first question I asked one of my patients when they come in when they're having mental fog is I want to get a good sleep history and they all have poor sleep histories. And we know that poor sleep is linked to more dementia, more anxiety, more depression. So you know you have to start simply before you can actually improve. Right.

Cheng Ruan, MD
Right. And we probably see similar patients who basically have a good control of everything there on a really good supplements. They're on a really good diet and when it comes to sleep hygiene they're not there. They're you know too much screen time and night time really deteriorates sleep quality. So that's there as well. And then we talked about carbohydrates and then also eating vegetables is important. The vegetables are carbs but there are different types of carbs can kind of break down like the good and bad carbs and what those really are.

Anthony Capasso, MD
Yeah, sure. So I mean carbohydrates in general are good, right? I mean carbohydrate is just another term for sugar and we break sugars down into either being simple or complex based on how quickly they get released in your bloodstream. And what we know is that if you eat a lot of simple carbohydrates, in other words, you eat something in your blood sugar spike, you know immediately after you eat it. That causes a lot of problems inside our cells and tissues. And there's something called A. G. E. S. These advanced like oscillated end products. So like oscillation is just a big word for sugar. The most common A. G. That most of us know about is the A. One C. Right? This is our diabetic marker that gives us a three month average sugar. So we're looking at hemoglobin, we're looking at how much sugar is attached to it. I tell my patients this is like the internal sugar. Ization or caramelization of what's going on and we know that that is one of the main drivers of mitochondrial dysfunction. And cellular aging 100%. So simple sugars have a tendency to drive that process. So we really want to lower that, you know those particular things complex carbs get released much slower and they are better for us. And those are the ones that you're not gonna get as high as the sugar spikes. There's less likely to promote those A. Gs. or just you know increase that inflammatory kind of process,

Cheng Ruan, MD
Right? No absolutely. So A. G. S. Uh these are products that are highly metabolically active within our body but as it turns out you get A. G. S. Not just from carbs but high temperature proteins like fried stuff and bacon. Uh And even the low and slow Texas barbecue that I actually

love. Uh yeah the burnt ends. Those burnt ends are actually a Gs as well. And so it's not just about the carbs it's about like you can you can induce a lot of toxicities of proteins as well. And so you know because there's a lot of people who are watching this or they're either a keto or paleo is like yeah you know I eat bacon and eggs breakfast but no car was like well I'll be eating bacon technically you're eating some Aggies there that spike your blood sugar as well. So But yeah and all they all affect amount of condiment. It's really complex. It's definitely a complex topic so recently and I wanted to kind of comment on this one did experiment and my dad is going through some metabolic and diabetic issues. And I you know to convince him to where A. C. G. M. Continues to monitor. I wore one for myself. Now I don't have any metabolic issues or anything like that.

But I learned a lot about myself is that if and this is something that I've been noticing by myself. My brain fog comes even if I eat like super clean but my stress level is high and my stress level like makes me like look at the computer screen too late at night time. My sugar stays the entire night at like 101-1 15. Alright if I eat the same exact thing and then I shut my brain off and do some mindfulness meditative practices. My average sugar is 76 you know throughout the night and and I never appreciated how how my daily behavioral habits really really challenged you know my metabolic factors right? Which kind of tells you it's not just about diet, it's about timing of eating, it's about stress reduction, it's about sleep, you know? And so what do you think is causing that big gap between the way my body's not conjurers metabolize my sugars in that difference.

Anthony Capasso, MD

I mean hands down, it has to do with the adrenal stress, the cortisol that gets released. One of the things that I see in patients which come in which I'm sure you've seen is you know when you do extensive lab work you'll find, you know, someone's fasting sugar is elevated but their A one C. Is normal and their insulin maybe kind of moderately elevated. They may have some insulin resistance. First question I ask them is how are you sleeping? Because sleep apnea can be one of the big drivers of high cortisol and high cortisol can cause insulin resistance and can trigger higher insulin and more of a stress reaction that you're having. So balancing that sympathetic and parasympathetic tone, one of the most important things for getting good blood sugars and and we'll see this in an athletes that over train you know if you look at them they're like oh they've got to be healthy, they can't have any insulin issues or insulin resistance issues. And lo and behold there overtraining and when you look at their stuff you're like wow okay. And the hardest thing to tell an athlete is to quit training or to reduce their training

because they think they have to train harder and harder and harder. So that parasympathetic to sympathetic balance one of the most important things I think for what you're doing, you're realizing, wow. When I'm able to lower that cortisol level. My sugar control is much much better. Right? So yeah it's it's a common thing. I look at that and pretty much all my patients that come in because I see it so often

Cheng Ruan, MD
And reflecting what you said for athletes you know there was there was a U. S. Olympian that wanted to get some some ideas as to why some things were happening in her labs and I mean she's she's a she's a U. S. Olympian. So that's pretty pretty you know pretty thick uh and as clean as you can. But it's interesting is that the minute that we kind of discussed the stress and sleep in the mental health aspect and once she targeted that her blood work look complete different. No no supplements, no medications. And it's so crazy how not being crazy actually can help with your mitochondria health and your sugars and everything like that you know? And I'll never forget that because it's really changed the way that kind of I see things when it comes to you know overall overall mitochondrial health. So let's let's talk about So we kind of talked about the nutrition briefly. We talked about stress and and sleep. Let's talk about What are the things that the audience listening today can actually do to improve the Mitochondria Mitochondria health right after this discussion.

Anthony Capasso, MD
Sure I mean by far the strongest thing that improves mitochondrial health is exercise. It's just getting up and starting to do something and it doesn't need to be I got to go to the gym but it's it's truly exercise we know caloric restriction helps to stimulate mitochondrial biogenesis and upwards of 20% keeping your carbohydrates low because of the effect of carbs have on you know the injury to our mitochondria. You know those would be some of the simple things. And then there's a whole slew of nutrients that I absolutely love. Everything from Co Q. 10 to resveratrol to acetyl l carnitine to Argentina alpha key conglomerate. So there's a lot of different nutrients that can support mitochondrial biogenesis Which is basically creating new mitochondria.

Cheng Ruan, MD
Right And you're and you're the brains behind this thing called pure neuro right? I want to talk about what your neuro is.

Anthony Capasso, MD
Yeah sure. So you know because of the prevalence of brain disease that we see on a daily basis I started to formulate a product based on how can I help preserve mitochondrial function. How can I preserve the blood brain barrier And you know and and support you know brain function. And so as I started to to do a deep dive into the research one of the nutrients that really really kind of resonated with me was Brazilian green Pro palace and propose this is found in the protective resin of beehives and there's over 300 natural components and properties including vitamins minerals, healthy flavonoids and you know it's been it's highly regarded for its ability to provide brain brain health and also immune support and as I started to read more and more about proper lists. I found out that it can reduce really high levels of oxidative stress and reduce your body. And when you start looking at clinical studies it's you know it's an anti cancer, it's an antibacterial antimicrobial anti ulcer. So there's all of these anti inflammatory all these different things that has been clinically studied. And so I'm like well what about the d. Pro palaces is you know gives it its banks, so to speak.

And there's something called Cape which is the cafe kassid fennel Esther and polly female that has incredible, incredible antioxidant capacities. And one of the studies I remember was a Japanese study. And what they did was they they they exposed human brain cells to the kind of stressors that are you know that can cause injury and then they treated half of it with the green populace and they were measuring that those reactive oxygen species and what they found is a very strong neural protective effect with the Acropolis. So you know once I saw that I'm like okay this is an interesting product. And then I read more about it and green properly increases something called BDNF and BDNF I I think of as kind of miracle miracle growth for your brain cells right, it's this protein that helps your neurons survive. It helps improve growth and the maintenance of it. And so now I've got a natural substance that increases this antioxidant capacity called Cape and then increases the BDNF? I'm like okay this is perfect, right, we're lowering all that oxidative stress to protect our mitochondria protect the blood brain barrier and also stimulating the neurons to work better and to and to hell yeah.

Cheng Ruan, MD
So the increasing reactive oxygen species means that there's less damage. Increasing BDNF brain derived neurotrophic factor means that increases the ability for the brain to to go into regenerating face. Right. So no, that's wonderful. And this is called pure neuro. Right.

Anthony Capasso, MD
Yeah.

Cheng Ruan, MD
And so and everyone is interested it's you can get pure neuro dot com can actually check that out and we'll have the link in the description as well. So when do you think is a good time to look at the brain in terms of, gosh what I do first You know, maybe my stress and sleep is a little better now. Like is it more important to take supplements? Is it more important for you to do the whole dietary thing or is it more important to just focus on hydration and we know all three are really there. Right. But realistically speaking when people try to change everything all at once is a high extinction rate, meaning that there's a high likelihood that that that they'll just stop working and I like to tell the patient is gonna you know do a stepwise approach, what do you think, what are your particular steps to layer on for for people?

Anthony Capasso, MD
Sure I guess you know it's understanding you know because everyone's different, everyone's biology is different. It's not really understanding what that core issue that the patient has. You know if you're in front of me and I know that you're only sleeping four hours or you're getting up three or four times at night to go to the bathroom, I'm gonna work on that first because I know I'm gonna get the biggest bang for my buck right? I know that if we focus on your sleep it's gonna help with you know kind of resetting that process. If sleep isn't an issue then I will then I will you know look more towards nutrient supplementation and those types of things while we're slowly changing the diet because diets one of the harder things to change per se. But sometimes it's just reducing you know making one or two small changes. And so giving strategies to help patients with their diet is super simple right? Like don't skip meals or you know if you do plan on you know some it really it's understanding what their likes and dislikes are and focus on kind of what do I feel that main problem is hit that first and then I'll start working on the others afterwards.

Cheng Ruan, MD
Yeah absolutely man kind of call that the essential guide to practicing medicine I guess is the one lever to pull like literally biggest bang for your buck for the doctors buck and for the patients books, right?

Anthony Capasso, MD
Sure

Cheng Ruan, MD
to really improve this. So earlier you touched upon sleep and sleep apnea for example, so sleep apnea and upper airway resistance sort of in the same category affects one in four humans in the world, literally one in four humans. and so that's a huge population and the average number of people that has issues from sleep apnea and upper airway resistance is a hell of a lot, especially in a clinical setting and and and and stuff like that now we talked about this in another segment on this summit, but there's sort of this concept of a lot of people and most people who are diagnosed with sleep apnea, diagnosed with mild sleep apnea and I tell people that mild just means that by the numbers it looks mild, but then you may have a huge severe effect actually on right, can you just kind of give me your thoughts on on how important this this disorder of sleep, that means,

Anthony Capasso, MD
Oh it's it's huge. I mean you know poor sleep will up regulate over 18 different hormones, everything from a disconnect Integrilin to cortisol to all those stress hormones. So if you know, if you increase the stress hormones and understand that if those stress hormones are high it's gonna injure yourselves and especially your mitochondria mitochondria you know I kind of think of mitochondria as being super weak you know like pretty much everything injures it and so we have to we have to protect it So poor sleep you know just understand it's just not a sleep issue, this is a hormonal dysregulation and your inflammation everything's gonna get up regulated and and you're gonna get significant mitochondrial dysfunction from poor sleep. And that's why all those diseases that we mentioned earlier like mental diseases, anxiety, depression get worse, neurological diseases get worse because you're just continuing to injure the mitochondria at the core, you know the root of the problem.

Cheng Ruan, MD
Right. Right. And of course some infections worsen as well which is a huge implicate er in mitochondrial dysfunction and brain health as well. And so you know the we know now that sleep apnea is an independent risk factor for covid 19 morbidity, mortality like the propensity for you to die from covid sleep apnea is his own independent risk factor away from diabetes away from from age away from A. B. M. I. Right. And body fat percentage. So it's its own category. So that's how important you know that that really is and you know I think covid and want to talk to talk about that for a little bit Covid I think has taught the world about mitochondrial health far more than people realize because now it's really common to, you know, talk to people about like the brain fog, especially having covid and science infection and stuff like that. And we're able to

talk about immune health on a much higher level of education because that the public generally didn't have prior to covid 19. Right, So this idea post covid syndrome and post covid brain fog. How do you think the mitochondria is affected in something like that?

Anthony Capasso, MD
Well, it's definitely affected. I mean, you know, if you look at things that support mitochondrial health like N A C which is a precursor to glutathione, you know, there's four or five different clinical studies that show that that helps improve the mitochondrial function and some of those covid outcomes. So, you know, when I have long haulers that come in, it's all 100% mitochondrial dysfunction. And and if we support mitochondria with mitochondrial peptides like Nazi or mitochondrial supplements like CO Q 10 and A D NMR or even a product that I put together for myself and my patients almost 20 years ago called middle blast. Those are the things that really generate you know, the the healing of the mitochondria because you know, covid, you know, the one thing that that that Covid did as you mentioned with it, it made people really take a look at their own health and understand that if your body has a lot of inflammation or its immune systems turned on and out of control, it's gonna injure itself and again injuring the mitochondria long term cause all those fatigue symptoms, those cognitive issues. the stuff that we see in long haulers.

Cheng Ruan, MD
So final question and we'll jump off is what do you wish you knew when you first started your career, that you learned recently that you wish, Gosh, I wish I wish I knew that about, about that at that time. What is one thing you wish you knew?

Anthony Capasso, MD
Gosh? God, there's probably hundreds of things that I wish I knew right, you know, I think, you know, I you know, going to a regular al empathic program. I transitioned myself into more functional medicine through, you know, reading nutrients talking to my patients that had a lot of problems, whether it was leaky gut, whether it was, you know, fogginess and as they went through some of the alternative treatments I just kept my mind open, I read and I realized, wow, you know, we can heal things if we give our body the right nutrients to do this right? And to me that's the ultimate form of medicine, right, allowing our bodies to heal by understanding what it needs and and and supporting that process. So I wish that that transition would have occurred a little earlier. but you know, it's also, you know, put me in the place where I'm at right now, which is, you know self studying nutrition and hormones and aging. and I absolutely love the area of medicine that I'm currently in right now so

Cheng Ruan, MD
That's amazing. Amazing. Yeah. Well listen, thank you for coming on. how can people find you and how can people find what is the pure neuro that we were talking about earlier?

Anthony Capasso, MD
Yeah, sure. So my office phone number if they want to get in touch with me is area code 9046940992. You can visit our website thinmdmedspa.com if they're interested in some of the programs that we offer and then I provided that link if they're interested in purchasing the pure neuro which I think has been just incredible in regards to responses that I'm getting from our patients.

Cheng Ruan, MD
Right. And that's get pure neuro dot com. G T P U R E N E U R O.com. So thank you very much for coming on. What a fascinating talk about mitochondria and

Anthony Capasso, MD
thanks for having me. Yeah.

Cheng Ruan, MD
Listen, no problem. It's all it's always always fun discussing this and what's great about it is kind of our our interview has really reflected on what a lot of other experts have been saying on this particular summit is that there are there are many things to really focus on, but sleep and stress and nutrition is not something that people just ignore when it comes to brain health, right? No matter what anybody says, right?

Anthony Capasso, MD
Yeah, exactly. It's not sex, it's not sexy, but it's important.

Cheng Ruan, MD
Yeah. We'll make it sexy.

Anthony Capasso, MD
Gotcha.

Cheng Ruan, MD
Alright, Have a wonderful day. Everyone. Thank you.

Anthony Capasso, MD
You, too. Take care.