Genetic Factors Related to Mitochondrial Function Transcript

(Transcripts are generated by AI and may contain errors)

Introduction and guest background

Welcome back to the Restore Your Mitochondria discussion. I'm your host, Laura, for Ontario. I'm bringing you experts to help you boost your energy and fix your health so you can build the life you love.

Today, my special guest is Doctor Rita Marie Le Scalzo. Hi, doctor. Rita Marie. Welcome to the summit. Hi, and thank you for having me. So it's a fun topic.

It is. And I wanted to bring you on here because I wanted somebody to really dig into genetics for us. And talk about how our genes are related to mitochondrial function.

I think this is a big, you know, question mark for a lot of people. So thank you for contributing to that part of the discussion. Sure. Yes. You're there.

Yeah. You're the founder of the Institute of Nutritional Endocrinology. And you train health and wellness practitioners of all types to have the skills to find the root cause of health challenges that is so, so vital to be able to practice root cause medicine.

Now, your passion is about transforming our broken disease focus system, the current system we have into a true health care system. And you know, I came from that broken system for 20 years.

So I applaud you for being one of those people who is here helping to patch that system and make it truly work for people. You are well known you're a bestselling author, speaker, internationally recognized nutrition and functional health authority.

You have over 30 years of clinical experience. You have a podcast, reinvent health care, and you provide health and wellness practitioners around the globe, to be part of the movement to provide root cause care to people in need.

So thank you. Thank you so much. And we're going to dive right in and talk about genes. So which genes are related to mitochondrial function? Doctor Rita Marie.

So before we dive into which genes, what I want to say is so many people want to spend their time blaming their genes for their dysfunctions. And I want to say that there's nothing about genetics that's black and white like that.

Yeah, there's a few diseases that we find that if you have this gene, you have this disease. It's very rare. I can count them on less than one hand. And what happens is we have we're dealt a set of cards, right.

Genes, epigenetics, and mitochondrial function

We're dealt a set of cards that say, here's how your cells, how your DNA is going to use the cellular mechanism to create different structures to create mitochondria real function, to, dictate specific pathways.

But just because you have a particular gene doesn't mean you're doomed to a life of misery. So in the case of mitochondria, just because you might have some of these mitochondrial related genes, genes that are related to the production of ATP to the production of energy at a cellular level, doesn't mean you're going to be just an exhausted basket case for the rest of your life, right?

I just want to make that really clear, because people wanted to say, oh, well, it matter whether I eat Eminem's or, you know, green foods. I have these genes, so I'm stuck.

So therefore I might as well eat the M&Ms and enjoy my life, right? That can't be further from the truth, right? So I think the way that I always think of it is you might have the genes, but there's this epigenetic switch that can be turned on and off, and you might be able to shut that off if you're eating the greens instead of the M&Ms. Do I have that right?

Exactly, exactly. And and we don't spend a lot of time shooting people, except when you're doing summits like this where you are educating people but the world at large, the medical system, the news media, the journals, even they're not taking the time to say to people, you can change your genetic expression by the choices you make every single day.

And I think that we get how many choices do we get to make all day long, all day long, all day long. Right. And, you know, if you eat, say you eat three meals a day, that's three different times.

You get to choose whether you're going to nourish your cells, whether you're going to feed your mitochondria, where you're going to enable your body to make energy, or whether you're going to starve them or poison them at worst, because as you probably talked about in this summit, mitochondria are little sensitive critters, right?

They just they're sensitive to oxidative stress. They're sensitive to chemicals in the environment. They're sensitive to foods, are missing nutrients and excesses of things that don't make them work.

Right. So they're sensitive and we have to take care of them. Yeah. So we're going to talk about which genes are related to mitochondrial dysfunction or function.

Which doesn't mean that if you have this genetic predisposition, it doesn't mean that it's going to be a problem for you if it doesn't work. Could you just you talked about genetic expression, genes.

Can you break down really simply for people? And I know I talked about the light switch, but I bet you have more to add to it. What is epigenetics? What does that mean when we hear epigenetics versus my DNA, my genes.

Right. So epi means on top of. So it's factors that sit on top of the genes that determine whether that gene gets turned on or off. Right. Whether that gene is functioning, in a proper way or whether that gene is not functioning properly.

If a gene makes you more prone on to a particular type of imbalance, the epigenetics controls whether you're going to express that or not. And what controls our epigenetics is, like I said, those day to day choices, the lifestyle choices, what you put in your mouth, what you put on your skin, the thoughts you think in your head, how you breathe right.

Everything in life affects our epigenetics. And so give you an example. Some of these genes that I'm going to talk to you about, I have what's called, well, what what the general public calls mutations in genes.

We don't talk about mutations. We talk about variations because there are variations in genes that are actually normal, that are actually just what makes us different.

Right? You have darker hair. I have lighter hair. There's a genetic EQ, I snip a single nucleotide or a set of single nucleotide polymorphisms, which is how we talk the language of genetic variation.

You have ones that predispose you to dark hair. I have the ones that get me right here. Does not make, you're damaged or I'm damaged. It means that we're different, right?

Yeah, but the truth of the matter is, is that between us, you and I, and everybody else out there who's part of the human species, we're like 99.5% the same.

And look at how different we look, right? We look very different. Yet we're 99.5% genetically the same went, which means that a lot of those variations that we see physically also are manifesting variations inside the way your

mitochondria work versus mine, the way your thyroid hormone, creation works versus mine.

Right. So we have to be looking at how can we change that? No, I can't change my hair color unless I buy a bottle of dye. Right? I can't change my eye color unless I get a pair of contacts that change the color of my eyes.

There's some of these things we can't change, but we can make it so that the genetic variants that may cause a weakness in a certain genetic or biochemical pathway, we can make it so it's not that big a deal.

So just as an example, I'm loaded with energy. I have a lot of these genetics that predispose me to poor mitochondrial function, to poor thyroid function.

Key mitochondrial genes and SNPs

Yet I'm able to overcome them by my choices. Oh, I love this. This is like the whole concept of bio elevating yourself. You are literally creating the environment for your mitochondria to function optimally because, you know you could have a predisposition to them not working as well.

So this is fascinating what genes are related to mitochondria function. So I'm going to just do a handful. There's there's probably a whole lot more. But I'm going to show you up 3 to 5 of these okay.

So there's one called you QCRC2. This is why we don't memorize these right. You're going to go around memorizing all these things. No. You look them up on charts.

And I've created this beautiful set of charts that I give to my practitioners in our training programs that list the major ones, not all 650,000 variants that we've discovered, but the major ones that we've discovered that have an effect on function.

So you could see our C two is important for the production of CoQ10 in the respiratory chain. So when we're making the mitochondria go through these three stages there's the glycolysis.

There's the Krebs cycle and the respiratory. There's all this stuff and there's different nutrients that are important to each place. The CoQ10 is critical in the respiratory chain.

If we have a snip there, we may not have enough CoQ10 that will feed into that pathway to make it efficient. And real quick, just tell us what a snip is.

So that's the first time we're using that word in this interview. So I did see it before, but I spelled it out single nucleotide polymorphisms snip. And what that means is when we look at the gene, the language of the genes, like we have the English language 26 characters, the Arabs have, what, 40 something the Chinese have like 80 something, whatever number.

That's the alphabet. So the alphabet of the genes is four letters, right. And they're called nucleotides. Guanine C, a adenine, cytosine and thymine. Okay.

So when you code these particular at, when we look at the code at specific areas on the genes, they'll have a specific letter, right. Associate a particular nucleotide.

One change in that nucleotide changes the expression of that gene. So they call them single nucleotide polymorphisms. Basically the of the public will say genetic defects or they're not defects right there changes in the code.

Right. So there's particular ones. We're not going to go into all the details about which letters and all that kind of stuff. But things you can look up.

Oh totally. Just want because we have practitioners and health consumers watching this. So we want to make it as

simple as possible. And I and if you want the more detailed, well, if you're a practitioner, doctor Marieke and Matt, you and and there's a lot of information out there on the internet.

So which genes? So you've listed one. Which other genes would you want to list today? Okay. So there's a few others. There's one called ATP five, G three, and there's a couple of other ATP type.

And it has to do with the synthesis of the ATP. It has to do with the pathways involved in creating, you know, we we put in glucose and we put in, oxygen and outcomes 36 ATP, which is the energy currency of the cell.

So there's all kinds of pathways. If you've ever looked at the the pathways involved in the mitochondria, there's different pathways and there's different nutrients that are required for this particular gene codes for a pathway or an enzyme that is important for transporting the mitochondria to transporting hydrogen, ie atom ions into the mitochondria for making ATP.

So that's another one okay. Got it. So so far we've covered a Co Q10 one and ATP one. What else. There's another one called Cox five ace Cox five. So cytochrome c oxidase five okay.

And that transfers electrons from cytochrome c to oxygen in the respiratory chain. So in the the Krebs cycle we're seeing like it's a cycle. And we see one chemical going to the next chemical going to the next chemical.

And we're basically adding things on or taking things away to get to the next in the next and the next and the next. And there's a lot of nutrient cofactors involved in those pathways.

So this particular gene Cox five has to do with the trans fur of these electrons from cytochrome c into oxygen in that chain okay. So pretty important right okay.

Very so so now we have a electron transfer gene. And then a couple more. One more two more. How many more. One more. One more that I'll talk about today.

And this is called end off. And there's an end of S3. There's a whole bunch of these ends. It's basically niacinamide adenine dinucleotide, Hydra, Hydra hydroxy that I get that, that that one that long being NAD hydroxy dehydrogenase.

Okay. And it's involved in the transport chain and the transfer of electrons from nADPh to Co Q10. So like I said, there's all these chemicals in there.

Niacin. This is related to niacin B3 there's some flavonoid ones which are related to B to there's others related to different different nutrients. And you're just basically moving electrons along until you get one la magic ATP which is energy.

Okay. Good. This is this is you're making this easy.

Nutrients that support mitochondrial energy production

So thank you. What? Okay, so let's talk about by what mechanism did these genetic snips that you just you've just listed four of them. By what mechanism do they affect mitochondrial function now.

So now we've laid out that there are some snips. What happens next. Yeah. So if you have these snips and they're active now with this end do you if there's a gazillion of them and you know that you can list them out in a genetic report.

Some of them, they have these things called IDs that are used in research. And so if you have a snip in one of these, but all the others are okay, you might have it just a slight slowing down of the function of moving the electrons from nADPh into Co Q10.

If you have a whole bunch of these then you have the risk of much higher risk of slowdown of the function. So what becomes really important if you have any of these snips, any of these possibilities for slowing down this process of creating ATP, you want to look at nutrients, right?

So for example, with the first one that I mentioned, which is the you g ukr c2, which is related to the cocaine ten, we want to look at. Okay. Well how do we improve our co Q10. Right.

We want to have more Co Q10 there so that we don't have to rely as much on this. There's snip and there's all kinds of ways you can do it. Obviously you can take a supplement of Co Q10 which is highly advisable if you're on a statin by the way.

That's another story. But Co Q10 is also rich in a lot of foods. And some of them are just common foods that we eat on a regular basis. So if you, focus on getting these foods, if you have this genetic, it's you're not going to see a big impact of it.

And by the way, most research shows that the genetic, snips our baby 95% of the efficiency of the bit pathways. It has to do with the epigenetics and the choices we make.

That's the other 95%. Yeah. So there are nutrients that can actually support mitochondria dysfunction. Even when you have these snips, you just kind of mentioned CoQ10.

But I bet there's so what can everybody take CoQ10. Or is this something that we should test for to see if you need it? You know, you can take it? I don't you know, I think I can't say that everybody can take it, but you can also get it from food.

Right. And co you tends not cheap. So if you want to eat foods I can read you off a few of these foods. I have a list in front of me. Yes at a common inexpensive foods olive oil, sesame seeds, pistachios, walnuts.

Hazelnuts. Almonds. Natto which most people don't like. But the Japanese do it well and it's a really good anticoagulant and really good good thing it just doesn't taste all that good.

Broccoli, chestnuts. Chinese cabbage, sweet potato. Sweet pepper. Garlic. Tofu. Peas. Cabbage. Millet and buckwheat. These are all high sources, good sources of CoQ10.

So if you have by any chance this snip, then you make sure that you're eating an abundance of these foods on a regular basis. Okay. Yeah. And that's sort of you made me hungry going through the lab.

So we. Romans a little bit. Yeah I know right. Yeah. So what other nutrients can support. So the nutrients we mentioned already, the NAD is niacin. So niacin is a super important one.

So vitamin B3 is niacin. So B2 flavonoids. So F adds another cofactor in there, another, you know, cog in the wheel of the Krebs cycle. If you want that, that B2 and again in the form of fatty flat and adenine dinucleotide okay.

There's a bunch of amino acids. So what that means is that you need to be eating sufficient protein, not too much, not too little, but also have good stomach acid.

So your body can break that out and break down the protein. Right. So it all comes down to like all these efficiencies in the body. Yeah. So it's not enough just to eat the foods.

You got to have a healthy gut microbiome from top to bottom to extract the nutrient. What I'm hearing exactly exactly. We know that things like magnesium, most people are deficient in magnesium because they're not eating magnesium rich foods.

So things like green leafy vegetables and chocolate, it's a good way to get it. But most people are eating their chocolate. You know, it's not done in a very good way.

You can eat. I eat 100% chocolate. I just have 100% right. It's because it's good. It's a good source of magnesium. It's got some good calming neurotransmitters, a little bit of caffeine, but not enough to really damage the cells.

Yeah, most people are eating their chocolate with anti nutrients mixed in. Yes, yes. With sugar and milk and preservatives and hydrogenated oils and whatever else.

Yeah. But you get a good piece of dark chocolate. It's going to support your mitochondria. That's so good to know isn't it. When I feel better about my dark chocolate love.

So you mentioned B3 and B2. So niacin and B2 flavonoids. Can you talk a little bit if you happen to have a list in front of you of some of those foods that would be supportive?

I mean, this is so helpful for people to know, how can I. Yeah, naturally. Yeah. So, I don't have a list in front of me, but off the top of my head, the B vitamins are high in things like whole grains.

And I know a lot of people don't eat grains because they're trying to, you know, go keto or paleo or whatever, but they are high in those foods. They're high in nuts and seeds.

They're high in legumes. And guess what? Green leafy vegetables. So they all have a fair amount of the B vitamins, especially B2 and B3.

Foods and habits that damage mitochondria

And if you're drinking alcohol, you especially need extra of this because alcohol impairs the utilization of the B vitamins. Right. And so a lot of the alcoholics get that, you know, the, the, the DTS and all this kind of stuff because they are depleted of these nutrients.

Right? Yes. And then if you're a meat eater, you can get some B vitamins there too. You can absolutely. Yes definitely. And these amino acids now. So amino acids really plentiful in animal products.

But you can get them in plant products too. Oh, absolutely. Absolutely. Suggest for amino acids because those are so important for mitochondria. Yeah. My favorite source is hemp seeds.

It's got all your, your necessary amino acids. I use nuts and seeds. I there's a lot in vegetables. I was just showing somebody on there's an app called chronometer, and I was showing her how she can increase.

She's plant based, 100% vegan, and she's like, oh, what do I need for extra protein? And we just took these things and put them in her diet. And the chronometer app added it up two cups of broccoli, two cups of dinosaur kale, and it gave her an extra almost ten grams of protein.

Right. And that's a fair amount. So really eating whole foods, you're not going to get a lot of protein in fruits. You're not going to get it in candy bars.

You're not going to get it in those kinds of foods. But you will get it in Whole Foods, plant based or animal based. So supportive. And that's what we're hearing over and over again on this summit is eat, eat foods in their whole form.

Stay away from processed foods. So on that note, what are the foods that hurt mitochondrial function with these poor mitochondria? They're so sensitive.

They, you know, things that we, we just totally need to avoid. So sugar. Right. Obviously talk about processed food. It's the ultimate processed food.

It's just the fuel taken out without no proteins, without the the B vitamins and all that. And B vitamins are, like we said, super important for the mitochondria to function.

Trans and heated fats, not just the stuff that says partially hydrogenated soybean oil right in Jiffy peanut butter or the commercial peanut butters and other thing.

What? Jiffy peanut butter is bad for? Partially hydrogenated to say nothing of the aflatoxin and all the other kinds of stuff that's in there. But we don't have to get the sugar trans fats right?

Margarine, mayonnaise. Like we had this whole shift like, oh, saturated fat is bad. And everybody stopped eating butter and started eating margarine. So we discovered how bad margarine is.

It's damaging but also heated fats. So a lot of people talk about like oh yeah, just throw it all in the, in the oven or, or like making keto cupcakes.

And we're using high omega three and six foods in the oven at 450 degrees and baking them. And that creates oxidative stress. It creates oxidative byproducts.

And the mitochondria are extreme sensitive to that. So I recommend if you're if you're going to heat I don't I don't recommend oils. I, I recommend whole foods plant based fats as opposed to oils.

Right. Do vegetable oils and all that. But if you are going to make a stir fry, use something like olive oil or coconut oil because it's more stable. It's not going to break down at those start at those temperatures.

Yeah. Or smoke. Don't heat your fats. Just eat them in the raw state MSG right. We see that a lot. You go to Chinese restaurant syndrome. Ask about it before you eat foods at a restaurant because a lot of places are putting it in.

Plus any food that has hydrolyzed vegetable protein, that's a msg, guys, right? Damaging your mitochondria, the preservatives, the additives that are in there, the artificial colors and flavors.

So on that note, if you're reading a label, it might not say MSG. It might say hydrolyzed vegetable protein to trick you because there's this movement of don't eat MSG.

So you're looking at something and you don't realize, oh, it's just another way to say MSG. Exactly. Exact. And there's a lot of that, you know, deceptive food practices unfortunately abound because the companies are not out for you to be healthy.

They're out for them to make a profit. And they quite frankly don't really care much about eating healthy. That's really hard to wrap your mind around. Right.

Because you think how could somebody be putting out products and taking my money if it might hurt me in the long run. And by hurt you we're talking in this in this talk about hurting your mitochondria, turning on those epigenetic switches. Exactly.

And they are going to stand responsible for that. So you have to do it yourself. You have to do it exactly. And that's why, you know, educating yourself by coming to things like this kind of summit where you're hearing from a lot of experts in the field that I don't have a financial gain.

If you if you eat white flour and, and hydrogenated oil versus you eat whole foods, I don't benefit either way except for my heart because I want to see healthy.

I mean, but these companies are not like that. So you really have to read your labels because it's really, really important. And not even that eating in restaurants is really tricky because they might say on the menu, they say all the right things.

They say it's a grass fed, whatever it is, or it's a wild caught or it's a with, you know, farm to table fresh, you know, organic vegetables. But what are they cooking it in and what and what are they putting in the sauces?

I mean, even these restaurants that are touting really healthy ingredients, they are in the business of making money. That is their point. They want you to come back.

They want you to be addicted to their food. So they do put ingredients in there that stimulate your brain, get you excited, and they also use cheap seed oils because it's expensive to cook things in avocado oil.

Exactly. And ghee and, olive oil. Right. It's all and that's what they're going to use that they're going to use as processed seed oils because they're cheap.

Canola oil is very common and very cheap. They can get them in huge vats and, and be careful because sometimes they just reuse them over and over. Oh, especially for frying. Exactly.

Right. Exactly. Yeah. Not good. No. Okay. So we've really talked a lot about food.

Lifestyle strategies for better mitochondrial health

In the time that we have left, if we could go a few more minutes. Just talking about what are some of the other lifestyle things because you mentioned, you know, lifestyle will very much support keeping these, genetic snips off.

All right. So what else would you say when you're, when you're working with your patients or your teaching practitioners, what are your top recommendations?

A couple of things I'm going to start with breathing because oxygen is so important. Right. Oxygen plus glucose fed into the mitochondria plus all the nutrients.

The B vitamins the amino acids equals energy. So if you're not breathing, if you're doing that shallow breathing because you're stressed out, you're not fully oxygenating, that's important.

So breathing is you know it's critical. And yeah, we can't live without breathing. But we don't necessarily thrive from the kind of breathing that we're doing.

So that's what I would look at is breathing number two to sleep like sleep is one of the most damaging things that you can do. Lack of sleep to your mitochondria. Right.

And what a lot of people don't realize is that mitochondria produce some of that melatonin and, and, and mitochondria require good amounts of melatonin.

So if you're getting, you know, short sleep and you're going to bed late and you got all the blue light coming into your eyes and you're not making enough melatonin that can cause damage to the mitochondria.

And overnight, what what do we do? We detox, right? We cleanse the cells. And the mitochondria are very prone to oxidative stress. So if you don't have enough sleep and you don't spend enough time in that mode of of cellular debris cleaning, then poor mitochondria aren't going to work very well.

No, that's all for it. So breathing, sleep, food, what else? Stress is super important. And when you're under a lot of stress, your body produces cortisol, cortisol and melatonin don't play well together, so it affects your sleep.

Cortisol causes your body to mobilize storage sugar stores right places where you've got it in your in your muscles and the glycogen in your muscles, or the glycogen in your liver or the fat stores and it mobilizes out so you can run away from hungry tigers.

Well, I don't know about you, but I haven't had a hungry tiger chasing me recently. Right. Most of the stress has to do with that soft stress, as we should, we could say.

So it's really important to get enough, mindfulness practice going on the breathing, appreciation. Meditation, yoga,

things like that to dissipate that stress and get your cortisol levels to where they should be.

Okay. This has been so good. And what anything else? Anything else you want to throw out before we wrap? I want to throw out alcohol. Yeah okay. Because I see it I see it a lot in the health room.

People who are into health drinking organic wine. Well, number one, it plays with your blood sugar and it throws off you know, the whole insulin thing.

And if you don't get the sugar into the cells, the good insulin receptivity on your cells, you're not going to be able to make make energy in the mitochondria because you don't have the raw materials.

You don't breathe right. You have a lot of sugar coming in. You have insulin resistance. So we really want to stay away from alcohol because it damages brain cells.

It damages liver cells. It damages the gut lining. It thins out the mucosa in the gut. And so we don't get all those nutrients absorbed as well. So those are my my main ones I know I'm no fun. No.

But this is really important to to say the things that are no fun because people are here because they really want to shift their health, they want to have high energy.

They want to be productive in their lives. They want good health. They don't want to. I mean, they're they're oftentimes helping their aging parents deal with health problems.

And they want to do what they can. So just know that you are not your genes. You don't have to go down the same path. You can absolutely control an aspect of this.

Thank you for making, the conversation about genes so easy to understand, so simple and so hopeful. I think that's the central theme here, is there's so much hope for people.

Yeah. And it's all comes down to choices, right? You you set your mind on what you want most. Do you want chocolate cake most or do you want a lot of energy and longevity and good health.

And then you make choices around what you want most and when you make those good choices, you feed your mitochondria. You don't damage them. You have more energy to do all the things you want to do.

And I'm going to say one last thing, because people think of energy as I am energy. I can go hiking, I can do this and that. But it's more than just the external expression of energy.

It's cellular energy. Do yourself. I have enough energy to bring the nutrients in and push the waste out.

Closing thoughts and where to find Dr. Rita Marie

In every single system in the body relies on good cellular energy for all the pieces of that system. I'm so glad you said that. The way that I, the way that I explain that in my lower brain is that we have physical energy, that we notice the energy that we feel throughout the day, and then we have invisible energy.

And that's what's happening in the cells. And that's what's making our lungs work and our heartbeat and our food digest and our brain think and nerves fire and every aspect of everything that happens in our body.

So invisible and we don't realize it. We only realize what we feel. But there's so much more going on that we just don't have a sensation. Yeah. Well, and what happens is you get chronic illness and then that's really.

But that's the sensation that things aren't working. That's when it comes out. But then it's been going on for so long and it's harder to reverse because the body's pretty resilient.

But once it gets past the point of no return, it's harder. And when you start to see the symptoms is a sign that something's been distress for a long time.

Thank you so much. Can you share with our audience where they can get in touch with you, where they can find your work and yeah. Yeah, absolutely. So my, consumer work, my for the public work is that Doctor Reid and recon and I'm on Facebook, Doctor Reid Marie on Facebook and Instagram and YouTube and all that.

And I'm pretty active there. And then, for practitioners, Ironi method, the Institute of Nutritional Endocrinology method, Ironi method.com. And that gives you more information about what we do.

Perfect, perfect. And just one last thing I want to say. I get to see you multiple times a year. And, and I will say to our audience that you walk the walk and talk the talk and live the life when we are at events together and retreats and masterminds and all the things that we do, you are actually living the lifestyle that you just explained here.

So I just want to acknowledge you to that acknowledge you and say it doesn't go unnoticed. You are you healthy all the time. You try. I work at it. It's my it's most important thing to me.

You're an inspiration to you. Thank you, doctor Rena. You take good care. Bye now. Thanks. Bye.