Mitochondrial Peptides: Have We Found the Path to Optimal Health and Longevity?

Dr. Kent Holtorf interviewing **Dr. George Rice, MD**

Kent Holtorf (00:00:00):

Hello, this is Dr. Kent Holtorf with another episode of the Peptide Summit. Today we are honored to have Dr. George Rice who is going to be speaking on mitochondrial peptides. Mitochondria peptides, have we found the path to optimal health and longevity? I really think this is a key. We've got pharmaceutical companies pumping tons of money into this because you look at—basically all the diseases of aging have to do with low mitochondrial function, neurodegenerative diseases, the cells don't have enough energy and they just end up totally dysfunctional. They cause mutations, they cause cancer. So looking forward to this talk. A little bit about George. He's known as empowering and a guide to authentic next level health. He is a specialist in precision performance medicine. He believes that one should not just survive but thrive. He's an expert clinician known for getting people to look and feel better than they thought they could. I love that, we see it all the time. He combines state-of-the-art life style assessment technology with cutting edge epigenetic coaching—we'll have him explain that—peptide therapy, hormone optimization, and functional medicine to guide motivated clients to their full health potential. He is passionate for clients to develop the knowledge to obtain next level physical performance and youthful appearance and longevity. I agree, it sounds like he becomes partners with his patients, which I think is key. He received his BS in psychology from Stanford, not too shabby. He obtained an MS in health science management, and an MD from Rush university. He completed his family medicine residency at the University of Southern California. I won't hold that against him.

George Rice (00:02:16):

[Laughing]

Kent Holtorf (00:02:16):

He is board certified in family medicine. He is certified in age management medicine and certified by the Academy for Preventative & Innovative Medicine in the advancement of bio-identical hormone replacement therapy. He is certified in functional medicine through the Institute of Functional Medicine. So you can tell he's been to a lot of courses and gone through a lot of

training. He's recognized as an IFM certified practitioner. He is specially trained in functional medicine and nutrition, so highly qualified I'd say would sum it up. Thanks, George. Thanks for being on.

George Rice (00:02:57):

Thanks Kent. It's great to be here.

Kent Holtorf (00:03:00):

Very much appreciate it. It sounds like you're doing great work.

George Rice (00:03:05):

Well, it's all part of—it's a passion, right? It really is a statement about what we need. It's really a myth that you have to feel poorly as you get older. I really created all this stuff and participate with my clients to help change that. So, thank you for allowing us to get the message out.

Kent Holtorf (00:03:32):

Thank you. I think that's that paradigm change where standard physicians are lagging way behind, where you don't go in until you've had a heart attack. Until you're feeling so horrible and 9 times out of 10, they don't know what to do with you.

George Rice (00:03:50):

Right.

Kent Holtorf (00:03:51):

Because—I've brought this up, I don't—I blame the physicians a little bit, but it's the system. They don't get paid extra for learning more.

George Rice (00:04:03):

Right.

Kent Holtorf (00:04:03):

It's who cares less wins, 'cause they can see more patients. So a breath of fresh air, doctors like yourself are few and far between, especially in Alaska!

George Rice (00:04:17):

Very far between. [Laughing]

Kent Holtorf (00:04:21):

Yeah. So how many doctors do anything of this sort in Alaska?

George Rice (00:04:26):

Oh, there's a couple. There's a handful. Off the top of my head there's 2 or 3 who are dedicated to functional medicine and shifting the paradigm. And you make a good point, this—I try to straddle both systems. I try to straddle traditional medicine and bring this into traditional medicine because I saw the impact it made on my patients. So you're right, it's not their fault, meaning it's not the system's fault. The system is doing exactly what it's designed to do. It's designed to treat acute problems and disease. We can't fault it for that, but—and again, to your point is, when we get this new information and ability to make a difference and change, it is on us to do that. So, I try not to pit the two—the paradigm against the other paradigm. In fact, I really pitch it as this is just extra tools for your toolbox. But it is difficult to do in the other system. So you're right there.

Kent Holtorf (00:05:38):

Yeah, I guess—yeah. I'm guilty of that because—I don't know, I've just seen so many doctors that—I don't know, you may have seen this—where you send a patient back. The patient loves their doctor, right? But they haven't got better for 10 years and they come to you, they get better, you send them back, you think their doctor will call you and go, "Oh, what'd you do?" No! They're like, "That's quackery!" If a doctor doesn't know about it, it's quackery. The least they know, the more adamant they're right. But I'll get off my soap box now.

George Rice (00:06:15):

[Laughing] Yeah. We can chat about that offline. [Laughing]

Kent Holtorf (00:06:20):

So, anyways. There's a lot of good physicians, but a couple of bad ones really, argh!

George Rice (00:06:26):

[Laughing]

Kent Holtorf (00:06:26):

Well, let's talk about mitochondria. First, what are mitochondria?

George Rice (00:06:34):

The mitochondria, of course, we all forget about it, right? That first year of med school, it's like you cram it in and you can't wait to forget it, but I wish I had paid a lot more attention when I was in med school because it's actually critical. So the mitochondria are—as I talk to my clients—these are the little critters inside all our cells that make energy and they are the—I call them the switch boxes. So food, oxygen that comes into our bodies, they take that and convert it into energy and they make us run. So it seems to me that you have to look at the mitochondria if you are looking to get people to optimal health. It has to be part of the equation.

Kent Holtorf (00:07:25):

They do a lot more than just make energy we're finding out now, too.

George Rice (00:07:29):

Absolutely. So that's how we're traditionally thinking of it. They do a lot more, so they regulate whether the cell lives or dies. They regulate how much calcium is in the cell, and that alone regulates lots of other processes, like how much insulin you put out if you're a diabetic or you have too much sugar, so they do a lot and we're learning more and more about them almost every day.

Kent Holtorf (00:07:55):

What happens, and maybe what conditions, if the mitochondria become dysfunctional? Even with age they start declining, but what are some major things that happen? And what are maybe some major diseases that are clearly associated with mitochondrial dysfunction?

George Rice (00:08:18):

My answer is everything, right?

Kent Holtorf (00:08:24):

It is. Yeah.

George Rice (00:08:26):

But you're right, we've associated and are beginning to recognize, at least in the literature, a strong association with mitochondrial dysfunction with, for example, Alzheimer's dementia, for heart dysfunction, heart failure, the beginning of atherosclerotic disease. Autoimmune, that is a big issue. And that's—right away, people recognize the role of mitochondria in autoimmune dysfunction. So inflammatory bowel disease, multiple sclerosis, psoriatic arthritis, so all of those

connective tissue disorders mitochondria are playing a central role. Because—and the reason why I say all of it is because it's all about how much energy do you have to make things work. That's what it comes down to. There's generally, in the health world, there's 9 hallmarks of aging and longevity. Mitochondrial dysfunction is one of them, but for me and through my lens, everything. Everything goes through the mitochondria and also hormones. So they're critical.

Kent Holtorf (00:09:40):

Yeah, those go together. Yeah.

George Rice (00:09:44):

Absolutely.

Kent Holtorf (00:09:44):

Yeah. I mean, you fix the mitochondria, you're gonna fix a heck of a lot of things, you know?

George Rice (00:09:50):

Yes.

Kent Holtorf (00:09:50):

That's what I don't see in like heart failure, it's like they do nothing to fix the heart. I had heart failure myself from Lyme, and a big part of my treatment was rehab in the mitochondria. The cardiologist said, "Oh, you'll maybe get 10% better in 10 years." No, just forget it. I'm like, "I can't walk upstairs. I can't—" Then a year later, peptides were the key, STEM cells also helped, ozone, and a lot of things. And he's like, "Wow, we've never seen that before." Did he ask what I did? No.

George Rice (00:10:31):

No. [Laughing] Of course not, right? It's a miracle, right?

Kent Holtorf (00:10:35):

But, yeah. So we've kind of got to the importance of mitochondria. What are some of the things—like, how does someone know if they have dysfunctional mitochondria? Do they have one of those diseases? Or tired, or forgetful, or what are some of the—for like the average person?

George Rice (00:10:59):

Yeah. So that's a great question. As of now, do we have specific tests specifically for mitochondrial function? And that's no. But, as you know clinically, there are some big signs and so chronic fatigue, autoimmune imbalance. So people who have allergies or what we call fibromyalgia, right? Chronic fatigue syndrome, any autoimmune issue, pretty much, you can take that as a sign of significant—

Kent Holtorf (00:11:34):

All those go together. You look at chronic fatigue syndrome, they did muscle biopsies in fibromyalgia chronic fatigue syndrome patients, and their mitochondria are all swollen. They're just even anatomically dysfunctional.

George Rice (00:11:51):

Yes.

Kent Holtorf (00:11:51):

People are like, "Oh, it's a made up illness! It's psychological!"

George Rice (00:11:56):

Right, because we don't.

Kent Holtorf (00:12:01):

They burn so many less calories, you know?

George Rice (00:12:01):

Right. To your point earlier, you were saying in traditional medicine if we don't know, then it doesn't exist.

Kent Holtorf (00:12:08):

Yeah, yeah.

George Rice (00:12:08):

Yeah. The science is there and the literature is supporting that. In fact, was it 2016? I believe there were a few articles. They looked at—they did muscle biopsies in insulin resistant patients, and consistently they have lower numbers of mitochondria. They have higher numbers of low functioning mitochondria, and they have mitochondria that are just not functioning well. Actually

they look swollen, right? Like what you said, swollen tissue because of dysfunction. So the evidence is there, is it proof? Well, I don't have to jump out of an airplane without a parachute to know what happens.

Kent Holtorf (00:12:55):

Yeah.

George Rice (00:12:55):

We just know, right? [Laughing] We just know.

Kent Holtorf (00:12:59):

I've written a couple review articles on hypothyroidism, or cellular hyperthyroidism, and the rate limiting step is your cells need energy to bring the thyroid hormones in. Any condition with low mitochondrial function, you're hypothyroid.

George Rice (00:13:22):

Right.

Kent Holtorf (00:13:23):

Yeah. Which compounds and perpetuates the problem because actually the pituitary sees the thyroid, but the rest of the body does not. And thyroid is one way to boost mitochondria, but if they're dysfunctional, you're beating on a dysfunctional cell. But it's nuts that they're just stuck on one paradigm that the TSH is the end all. You were mentioning the study that just came out showing TSH is very unreliable. Which I'd love to just get up and preach on that forever. Call the [inaudible].

George Rice (00:14:03):

Yeah. I remember—I think I was telling you earlier—when I was a resident I read your paper on the summary of thyroid function and I think you'd be happy because this paper that came out actually just extended and expanded on what you were talking about in the sense that TSH does not necessarily correlate with peripheral physiological process. It's really—the brain is happy. It has the ability to take its own thyroid hormone, but the rest of the body is suffering. So they did a study—they looked at all the studies in thyroid hormone and did a strong correlation of actually free T3 and free T4 are more indicative of the clinical condition of the client, of the patient. TSH was rated really low.

Kent Holtorf (00:14:52):

And it's like—or we'll suppress the TSH and they go to their endocrinologist or their doctor and they'll say, "Oh my God, you made them hyperthyroid." Their pulse is 54. They just gained 30 pounds, they can't get out of bed. Their temperature is so low. It's like, "Hello!"

George Rice (00:15:17):

Right.

Kent Holtorf (00:15:17):

It's crazy. Everyone's just stuck to this algorithm.

George Rice (00:15:20):

Right. Well it seems obvious to you and it seems obvious to me and hopefully we can get more people to be more obvious to it.

Kent Holtorf (00:15:28):

Yeah. Hopefully. I'll just mention, I've been working on a test for 15 years. I've got it 90% done, and then they can't finish it. But we're coming up with a test to show that. So, we kind of talked about the consequences. What if someone—healthy person—all of a sudden their mitochondria go, let's just say it's from toxins or whatever illness. What's the repercussions?

George Rice (00:15:55):

So you're right. People who are pretty healthy and they have a lower function, they may not notice it as much, it'll be more subtle. So—excuse me—people who are active, they may notice that they don't recover as quickly between workouts. They feel a little more sore and the soreness doesn't clear. They can't push themselves. They can't do as much high intensity training. So that's on the other spectrum. Of course, on the lower end, we're just—the average client who didn't work out too much, they just notice a lack of drive, focus, concentration, neurological decline. Physically they begin to put on a little bit of weight towards the middle, no matter what they do, no matter decreasing calories, exercising, their metabolism starts to slow, right? No matter what they do they can't get it to kick up again. So those are all big clues. Thyroid plays a big role in that, but certainly a big clue is that the mitochondria are beginning to be inefficient.

Kent Holtorf (00:17:03):

Yeah.

George Rice (00:17:03):

We've gotta address that. Yeah.

Kent Holtorf (00:17:05):

I find like post-chemo, which wipes out the mitochondria, I mean, these people just lethargic, they're depressed, but they don't know why.

George Rice (00:17:15):

Yup.

Kent Holtorf (00:17:15):

They really need treatment. I feel bad for them. Their doc says, "Oh, no, you're fine. Don't take anything." Like, you know?

George Rice (00:17:28):

Right.

Kent Holtorf (00:17:28):

It's just really effected them, had a couple of patients like that recently. You just power up their mitochondria and they're like, "Oh my gosh!" You know?

George Rice (00:17:37):

"What happened?" Right. Just simple stuff, right? CoQ10, D-ribose, I mean, there's tons of studies in the cardiology world about injury recovery. Until we can get the mitochondria back online D-ribose is really awesome

Kent Holtorf (00:17:54):

Do you like IVs or do you use some of the supplements?

George Rice (00:17:58):

I've used both. Because of where I am, I'm limited in terms of IV treatments. But I find that even just taking the powders, 3 to 5 grams a day.

Kent Holtorf (00:18:11):

You can also do NAD subQ, which—

George Rice (00:18:16):

How do you do that?

Kent Holtorf (00:18:16):

Yeah. Which is—you just basically take the vile, what is it? 100 or 200 milligrams per CC. 0.2 a day, and it seems to work really well.

George Rice (00:18:31):

Awesome.

Kent Holtorf (00:18:32):

Yeah. Along with—do you use also PQQ, MitoQ, those things? In fact, when we're using 5-Amino-1MQ is that also it stopped working. But we thought—we kind of overcharged the mitochondria and when they couldn't keep up with the—basically creating pro-oxidants inside the mitochondria, we'd give those and all of a sudden like, "Hey, it's working again!" You know?

George Rice (00:19:00):

Right.

Kent Holtorf (00:19:00):

Which makes sense.

George Rice (00:19:02):

Right.

Kent Holtorf (00:19:04):

So how do you protect the mitochondria? Or do mitochondria protect themselves? Or—how does that work?

George Rice (00:19:15):

Yeah, great question. This is all part of some recent research that's come out. It's pretty fascinating. So we used to think that—and you were probably taught like I was, that pretty much—this is how traditional medicine sees it. We just send signals to the organ and it does what it's supposed to do and that's it. Right? But now we're understanding that the mitochondria

actually send signals out and those signals are mediated through a class of peptides called mitochondrial derived peptides. So when the mitochondria in the cell gets stressed, it can actually not only send signals to the local community to bolster itself, like create more heat shock proteins, create more components for the electron transport chain to make more energy to start to absorb more of the oxygen so we don't make more free radicals, but even further than that, the studies show it actually sends signals out into circulation and into the CNS, the central nervous system. So it's not just the mitochondria being told what to do and they're misfiring, they actually are sending signals out to preserve themselves, preserve the cells, preserve tissue. So it's a fascinating network that we weren't even aware of. It just drives home the point that you're making, mitochondria are—they're the hub and if we want to optimize, we have to address that. So that's how they protect themselves. If we can support them with the right food, PQQ, CoQ10, which is an awesome antioxidant for mitochondrial function. Now we have the ability to provide the peptides themselves, meaning the mitochondrial peptides that they usually make themselves, we can actually provide them to you to bolster your own function. So it's wonderful. It's exciting. It's an exciting time to be a patient, I have to say. Yeah.

Kent Holtorf (00:21:28):

Yeah. As long as they don't get shut down.

George Rice (00:21:30):

[Laughing] Yeah, right.

Kent Holtorf (00:21:30):

That's a scary thing. "Hey, it's safe and working [inaudible] get them stopped."

George Rice (00:21:42):

Right.

Kent Holtorf (00:21:42):

But yeah, we found like, as you were saying, that they do a lot more than make energy. They tell the body when there's an infectious insult and send off all these different things and they'll go into the danger response and stop making energy and doing all these other things, you know?

George Rice (00:22:02):

Right, right.

Kent Holtorf (00:22:02):

It's good. So what type of peptides help mitochondria?

George Rice (00:22:08):

So probably the one—so if you have some patients or even doctors who are kind of looking into this, probably the one they heard about was called MOTSc. It's derived from the gene of the mitochondria, the mitochondria DNA, of which there are 37 genes and MOTSc is shown to really help bolster basically energy production. It does lots of stuff that's wonderful. It can increase its own production when it gets under stress, it helps sensitize the body to insulin. We haven't even discussed that part, inflammation and insulin resistance, which is the foundation of chronic disease. So these mitochondria work to decrease insulin resistance, increase insulin sensitivity and use, stop the process of dying off, meaning stopping apoptosis. So if—excuse me—if they insulted injury and inflammation and go too far, they continue to trigger the cell to die and that can cause a chain reaction. So these peptides help to kind of bolster the gates, kind of fight off that drive to die, and help the cell function better. And then other benefits are they also help to burn more fat. MOTSc in particular is actually been shown to kind of have almost the same effect as exercise—and you're probably familiar with this—in longevity and aging everyone's talking about AMPK, kind of the pathway to longevity. That's one of the reasons why there's a lot of talk about Metformin, right? Because it seems to have some impact on AMPK, but I'm not completely convinced from the studies. I'm someone who—I can't take Metformin, my stomach doesn't like it.

Kent Holtorf (00:24:11):

Yeah, yeah.

George Rice (00:24:11):

So there are a lot of people who are like that. So MOTSc helps to drive up that AMPK pathway, stimulating another enzyme called PGC-1alpha. That is kind of the master regulator of energy. It stimulates a whole bunch of nice pathways for longevity and health, and in particular makes mitochondria grow. So if you stimulate that AMPK pathway, PGC-1alpha goes up, your mitochondria go up, and then you just bolster cell protection and performance. So MOTSc has been wonderful and it's known to increase VO2 in athletes, increase VO2 max and help increase their endurance. So lots of positive benefit with MOTSc.

Kent Holtorf (00:25:04):

Yeah, I agree with the AMPK, it's like the hot thing. I've tried so many PK stimulators I'm like—you know? I'd rather see [inaudible] like with MOTSc, we've had diabetics that all of a sudden, they're like, "Oh my God, I've been on diabetic medication. Now, my hemoglobin A1C went from 7.5 to 5.8. I've lost 25 pounds." They're like, "Oh my gosh, where's this been?" You know, nothing works for everyone. It seems like some people respond better, but many, many, many people feel good with

it. They've got more energy, brain kind of lights up. What kind of dosing do you typically do with that?

George Rice (00:25:56):

So MOTSc—again, it depends on the client. Generally, if you're first using it somewhere between basically 3 to 5—I'm sorry, 5 to 10 milligrams for about 3 or 4 weeks initially. Then you go just daily after that. You can do it—actually a lot people talk about cycling, so this is another thing with peptides, particularly with the—this is typically used with a regimen with a growth hormone like receptor or peptide. You should tend to cycle those off. So what we do, we usually have people do it for a month at the higher dose and then once weekly for maybe 4 or 5 months and then come off of it and see how the body goes.

Kent Holtorf (00:26:49):

Yeah. I think it's always better to cycle, but I dunno. I doubt it. When I tell patients to cycle they're just [inaudible]. Yeah. [Laughing] I think it's really good. So what other peptides kind of go along with it would you say?

George Rice (00:27:09):

So certainly we like—and our clients like—CJC-1295 with Ipamorelin, so the combination.

Kent Holtorf (00:27:17):

Which is—if you can explain that. Secretagogues stimulates growth hormone.

George Rice (00:27:22):

Yes. Yeah. So these are growth hormone like peptides that help to interact with the complex network of the growth hormone environment. So we used to just say, "Well, your IGF-1 is low. You don't have enough growth hormone. Let's just slam the body with growth hormone." Right? And now we're kind of understanding that probably wasn't the best way, because it's a complex system and each system has its own set of receptors and they each have a different impact. So you may be bolstering, for example, muscle growth in this pathway, but you might be shutting down liver function over here because if you're stimulating the receptors too much and get downregulation of receptors, that can cause imbalance in other systems. So the nice thing about these combination peptides is we don't tend to see that. So we don't see the downregulation of receptors. We see a longer response, clinically, and more consistent and it's due to stimulation of multiple pathways in a balanced fashion. So you get all the benefits of growth hormone, greater metabolism, muscle growth, better insulin regulation, and particularly—and this is kind of the key

after mitochondrial function—lower in visceral fat. Now, like you said, weight loss. Weight just kind of comes off and people don't—they go, "Wow!"

Kent Holtorf (00:28:55):

Do you think the benefit in insulin resistance is solely due to the loss in body fat? Or do you see that occurring before that?

George Rice (00:29:08):

Again, you have to get thinking the complex system. So the insulin resistance most likely is being driven by lots of high intracellular fat, which is creating chronic inflammation. Inside the cell that chronic inflammation shuts down the body's ability to respond appropriately—or cells to respond appropriately to insulin. Fat accumulates, and they themselves create lots of hormones, which again, you and I were probably taught, fat is just inert, right? It's just fat. You just carry it around. Well actually no, there's about—I think the last count there's 26 or 27 hormones from fat and only maybe one of them is good for you. The others really—[inaudible].

Kent Holtorf (00:29:56):

[Laughing]

George Rice (00:29:56):

Right?

Kent Holtorf (00:29:57):

Yeah. Not a good ratio.

George Rice (00:30:00):

Not a good ratio! Right. So they create inflammation. So, it's not just about lowering the insulin resistance. It's about lowering the intracellular fat, which by the way, decreases [inaudible] enzymes in the cell, which creates more estradiol.

Kent Holtorf (00:30:23):

Yeah.

George Rice (00:30:24):

That's the association between—and we're kind of getting off track a bit, but it's fascinating. That was the association people were making with, for example, breast cancer and hormones. We saw, all the observation studies showed increased estradiol in breast cancer patients, so therefore estradiol must be the cause. So don't give estrogen to these clients. When actually the estradiol was just an innocent bystander as a product of upregulation of aromatase in chronic inflammation. You see lots of estradiol intracellularly, but it doesn't have anything to do with the cancer.

Kent Holtorf (00:31:06):

Yeah.

George Rice (00:31:07):

It has everything to do with inflammation.

Kent Holtorf (00:31:07):

I don't know, I see this too, where it's like all these guys who are low estrogen who are obese, which they have low testosterone and they give them the Androgel, which Aromatase actually upregulates and they're making more estrogen than they are testosterone.

George Rice (00:31:25):

Right.

Kent Holtorf (00:31:25):

Then they wonder why they keep gaining weight.

George Rice (00:31:27):

Right. It's not the hormone.

Kent Holtorf (00:31:31):

You're not doing them any favors.

George Rice (00:31:32):

Right. It's the underlying—it's the root cause underlying process that we're really addressing. So that's why addressing mitochondrial dysfunction, I think, is just going to open up a whole new world.

Kent Holtorf (00:31:44):

Yeah. It seems like you look at everything, it's like the core.

George Rice (00:31:48):

Right.

Kent Holtorf (00:31:48):

Fix the mitochondria.

George Rice (00:31:50):

Right. Right. Then everything else will kind of—you go upstream and fix the problem and then everything downstream will just almost kind of take care of itself. So, to your answer, it's not like, "Yeah, you're going to lose weight if you do this and that's going to solve the problem", you have to understand the whole process. So yes, we may lower inflammation and lower visceral fat, but for this person, it may be because their immune system is just wrapped up, right? This person, it may be they don't have the nutrients to support mitochondrial function. So now we've got to really bolster their mitochondria function.

Kent Holtorf (00:32:29):

Yeah.

George Rice (00:32:30):

Same outcome, same symptoms, different focus in clinical therapy.

Kent Holtorf (00:32:35):

Yeah. Let me ask you, how do you approach a patient? Like what typical tests do you do to try to solve this? Because I was just thinking, like you just have this global understanding, which I won't say anything bad about doctors—

George Rice (00:32:52):

[Laughing]

Kent Holtorf (00:32:52):

Is that to hone down? It's—I love getting tons of labs right up front. Sometimes it's not practical because there's costs and all those things. What's your kind of special, whatever, the Dr. Rice method of getting down to the problem?

George Rice (00:33:17):

Right. Well, it sounds similar to what you do, so yes. In our approach, in this functional approach, but actually it's become more of precision medicine, cellular medicine, whatever you want to call it now, we actually look at all—as many of your body systems as we can. So yes, we do typical lab work, but we also do functional diagnostic testing. So we do organic acid testing. We do what's called DUTCH testing, looking at the relationship between the brain, the pituitary, the thyroid, the gonadal adrenal axis. We do stool testing.

Kent Holtorf (00:33:58):

DUTCH testing kind of gives you adrenals and all the metabolites and all that. Can you mention organic acid testing?

George Rice (00:34:09):

Yeah. So organic acid testing is a simple test. It's a urine test. It looks at about, I believe it's about 85, somewhere around 90, metabolites through the process of the urine. It breaks them down into categories so I can get an idea if you have toxic overload related to yeast or mold or if you don't have enough healthy bacteria. In terms of gut health, we know that's a big issue. It's not so much whether you have bad stuff or not, if you don't have the healthy bacteria to, for example, regulate your immune system, because 90% of the immune system is in your gut, you're going to have problems no matter what you do.

Kent Holtorf (00:34:53):

It's interesting, the gut bacteria causes the problems, but also if you're sick you end up getting bad gut bacteria. [Inaudible]

George Rice (00:35:05):

Right, it's a full [inaudible].

Kent Holtorf (00:35:05):

Yeah.

George Rice (00:35:05):

It's all connected.

Kent Holtorf (00:35:09):

It's a cause and a marker.

George Rice (00:35:09):

Yeah, absolutely. So we can see if, for example, someone has too much Clostridium bacteria. Now they're not bad by themselves, but they can significantly disrupt neurotransmitter production in the brain. Wow. That's pretty important to know. We can look at oxalate production, lactic acid, and even more importantly, mitochondrial performance. So these—none of these tests are 100%. None of them are going—[Inaudible].

Kent Holtorf (00:35:40):

Because you paint a picture, right?

George Rice (00:35:42):

You paint a picture, absolutely. So to your point, it is nice that you order all those tests, because actually the more perspective you have, the more detailed picture you can create for that client. So it's worth it to get all those tests.

Kent Holtorf (00:35:58):

Yeah. It's sometimes hard to convince the patient, "Hey, spend a little more money, get this."

George Rice (00:36:04):

Right.

Kent Holtorf (00:36:04):

Because otherwise you can go down this path. All of a sudden you get a test and, "Oh my gosh, it's this!" Right? I'm sure your patients have been a lot of different places, at least ours have. They want the answer and you're not gonna do the same old tests over and over and over.

George Rice (00:36:27):

Right.

Kent Holtorf (00:36:31):

I think it's great. I'm sure you're reversing these people that—they might not be the sickest. They might be the sickest, but the quality of life just gets tremendously better.

George Rice (00:36:46):

Absolutely. I'm sure they come to you—I was kind of—"I've seen 5 other providers, I've been to 3 different specialists and they're all telling me the same thing, that I'm fine." Right? "That my labs look normal." [Laughing] "But doctor, I don't feel fine." So to your point, there's a—you need a different approach. So, yeah, it makes a difference. And not just for now, again, we're also looking at the client in terms of, what are you gonna be like when you're 98?

Kent Holtorf (00:37:17):

Yeah. Or are you gonna make it to 98 unless you do these things?

George Rice (00:37:21):

[Laughing] Right, yup.

Kent Holtorf (00:37:21):

Or you might make it to 98, but you're going to be in a nursing home and—you know?

George Rice (00:37:28):

With dementia, somebody having to feed you. Yeah.

Kent Holtorf (00:37:32):

Yeah. Who wants that frailty? That's like one of the number one killers. They say, "Oh, your cause of death is broken hip or subsequently pneumonia." But what got you there in the last 10 years? Mitochondria, also osteoporosis, instead they give you meds that stop the breakdown of bones, so you're putting bad bone on top of basically—good bone on top of bad bone. But yeah, I don't know. I just go crazy with the paradigm now.

George Rice (00:38:09):

Yeah.

Kent Holtorf (00:38:09):

But, let's see. Well, are there ways to protect the mitochondria?

George Rice (00:38:19):

Sure. In fact, giving the peptides is a great way to do that. Of course, hormones I'm a big fan of, and I know you are too. In fact, that's what kind of pulled me out of the framework. Hormones were—I thought that was going to be the magic for the rest of my life. It still is, but now we're learning a lot more. So yeah, peptides. Giving the peptides like MOTSc. Actually there's a couple of others. They haven't been ready for prime time in terms of human use, but they're getting close. However, tried and true, exercise, exercise, exercise, right?

Kent Holtorf (00:39:07):

Fake!

George Rice (00:39:07):

[Laughing]

Kent Holtorf (00:39:11):

I love exercise. It's a religion to me. I exercise every 4 months for 8 minutes.

George Rice (00:39:24):

[Laughing]

Kent Holtorf (00:39:24):

But I do my shots every day!

George Rice (00:39:24):

Well, as long as that exercise period is so intense, you're off, that's fine.

Kent Holtorf (00:39:31):

No, I'm on my phone for 4 minutes.

George Rice (00:39:32):

[Laughing].

Kent Holtorf (00:39:32):

But yeah, we have peptides to make your body think it's exercising. We have peptides that make your body think it's fasting. A better life through injections. I think you mentioned humanin, 5-amino 1MQ, some of them can be hard to come by but they're all similar. You know? They boost that mitochondrial function.

George Rice (00:40:05):

Right, right. They offer different pathways to do that. So again, the idea of you want to address the complexity to optimize the synergism of your body, and that's what the traditional system tends to minimize. It's not our fault, we're human beings and we tend to want to simplify things because we want to understand, right?

Kent Holtorf (00:40:31):

Yeah, the standard is one drug, one disease.

George Rice (00:40:35):

Right, right.

Kent Holtorf (00:40:35):

The biggest breakthrough was, "Hey, they found if you use 2 hypertensive medicines at a smaller dose, it works better than one." [Laughing]

George Rice (00:40:50):

[Laughing] Right.

Kent Holtorf (00:40:50):

[Inaudible] go with this drug, the highest dose and that doesn't work. You start with the second one. No start with—they're working on different pathways. That's what we're learning is [inaudible]. Not only that, it's much safer, much more effective and much safer.

George Rice (00:41:09):

Absolutely.

Kent Holtorf (00:41:09):

That's the nice thing about peptides is they don't do one thing where you can just overload it, it does multiple things. So it gets balanced. Yeah. So, what's kind of your favorite—well, let's say

when a patient comes in, what do you typically—do you start patients right off the bat with mitochondrial peptides? Or do you balance their hormones first, or nutrients, or get rid of fungus if you see it, or dysbiosis? What's kind of your pathway? I know everyone's different, but—

George Rice (00:41:52):

Yeah. Yeah. So basically, yes to all the above. So if I think it's appropriate to—just based on what the client's telling me—to start them on something, I will, as long as I don't think it might be interacting or I need to assess another pathway before I give it. For example, I would love—and I frequently give people hormones right away. So if you're—especially if you're a woman and have all the classic hot flashes, night sweats, weight gain, no libido, "I don't want my husband to touch me anymore", all that stuff. Right?

Kent Holtorf (00:42:30):

Hey, estrogen is a mitochondrial booster.

George Rice (00:42:33):

Absolutely. Absolutely.

Kent Holtorf (00:42:34):

Yeah. You look at all these menopausal women and the doctors say, "Don't take estrogen, it'll cause cancer!" It's like, okay, you're going to be demented in 10 years, you're going to get osteoporosis, you're going to be frail, you're going to—

George Rice (00:42:52):

Right.

Kent Holtorf (00:42:52):

Stop it! [Laughing]

George Rice (00:42:54):

Yeah. We forget to look at the other side of the coin. Yeah. Don't take that because of this, but what happens if you don't take it? Alzheimer's dementia, heart attack, stroke, cancer, osteoporosis, right? So we don't talk to women before menopause about any of these things really, or men for that reason.

Kent Holtorf (00:43:17):

Yeah, and the studies even show if you don't give progestin, not progesterone, it's actually—show me the study that shows increases breast cancer. The problem is in the literature, they confuse progestin and progesterone. If you want to give someone breast cancer, give them progestin, if you want to prevent it give progesterone, you know?

George Rice (00:43:44):

Yeah, and there's—I don't know if you are aware of Dr. Glathar,

Kent Holtorf (00:44:03):

Oh, yeah. Shown to totally decrease.

George Rice (00:44:05):

Right. Absolutely.

Kent Holtorf (00:44:06):

[Inaudible] my review bioidentical hormone debate?

George Rice (00:44:09):

No, I haven't seen that.

Kent Holtorf (00:44:11):

Oh, I'll say it now. It goes through all—everything from clinical to the biochemistry and every study, head to head, for instance, Estriol versus [Inaudible] versus Estrone, progestin versus progesterone, and shows that women should not be afraid of bioidentical hormones. Of course, it's like, "It's a made up term!" And it's crazy. This was out 15 years ago and it's proven true, but they don't say, "Oh, it's proven true", they just kind of start doing it.

George Rice (00:44:53):

Right.

Kent Holtorf (00:44:54):

More and more drugs are coming out that are bioidentical.

George Rice (00:44:59):

Right, right.

Kent Holtorf (00:44:59):

Yeah. It's scary.

George Rice (00:45:03):

Yeah, like peptides. So that's the nice thing about peptides is if they work, they work, if they don't work, guess what? You don't have—I have—to me, to date, I have not seen anyone have any really bad side effects from peptides because they are natural part of the system. So if they can't bolster it, then that means that there's something else not working, but it's not going to cause a side effect.

Kent Holtorf (00:45:26):

Yeah. Show me a medication that you can give a thousand times the dose and have no side effects. They can't find a toxic dose. You can't even do that with water!

George Rice (00:45:40):

Right. [Laughing] Right. Good point.

Kent Holtorf (00:45:43):

If you want to argue, it's safer than water. You'll die if you take a thousand times a dose!

George Rice (00:45:49):

Right. In that regard, if a woman comes in and she's not sleeping, and she hasn't had a period for 2 years, I'm gonna put you on progesterone. Within 3 days they're sleeping like a baby, their moods better, and I haven't even assessed their estrogen or testosterone yet. My only caveat to thyroid hormone—and I usually give that too, just based on symptoms, is I need to understand what's happening with your cortisol, because I've had a few—and you probably have too—all the typical thyroid hormone symptoms. You give them a little bit, and then they feel wired and tired. They don't feel good. It's not the thyroid hormone, as the emergency room doctor will tell you, right? "Oh, you've got too much thyroid hormone."

Kent Holtorf (00:46:35):

Oh, especially if you use T3, they blame it. Yeah. We find with the immune dysfunction, they're sensitive to everything. Even with a supplement, patients just react. I tell them, "Okay, look at the pill for a week, smell it for a week, take a little bit."

George Rice (00:46:54):

[Laughing]

Kent Holtorf (00:46:54):

They're much more likely to have idiosyncratic response, meaning that it has nothing to do with dose. Like they'll get palpitations, and of course they blame the thyroid. We had one doctor give one microgram, which I'm like, "Why do you give anyone one microgram?" It's like, physically you'd never know. The patients like, "Oh my God!" That's happened to her, of course, she goes to the doctor, blames us—or blames one of our doctors, and she had the same reaction to CoQ10, same reaction to like almost everything. But it's interesting, one study showed that people that have that, look for HHV-6. High incidents of that, that they have human herpes virus 6 infection, which isn't sexually transmitted. It's people with low immunity get it, chronic fatigue syndrome. But it's interesting stuff. It's one of those things, the more you learn, the more you learn you don't know.

George Rice (00:47:59):

I almost wish I didn't have to sleep because I've got a pile of stuff here to read and it's just fascinating.

Kent Holtorf (00:48:06):

Oh, if I were to show you everywhere—

George Rice (00:48:09):

[Laughing]

Kent Holtorf (00:48:09):

Yeah. It makes medicine fun though.

George Rice (00:48:12):

It is. Actually, I thought this was what medicine is going to be like when I went to medical school.

Kent Holtorf (00:48:19):

We'll see, we'll see who wins the election.

George Rice (00:48:28):

[Laughing]

Kent Holtorf (00:48:28):

We may have to cut that out.

George Rice (00:48:28):

Right. [Laughing] We'll play it after November 3rd and see what happens. [Laughing]

Kent Holtorf (00:48:33):

Yeah. No, but it's—I mean, there's a lot of powers to be that they want the status quo or they think giving everyone healthcare—I mean, it's gonna make everyone have horrible healthcare. I put out a health care reform plan and I thought—the thing is we think we're basically the opposite of socialized medicine where we have freedom of choice, but we don't! We are like—you look at the countries that are so-called more socialist medicine, you name it, Sweden, they have more choices than we do! You go to the pharmacy, you don't have any choice how much that drug costs. Choosing between insurance companies is not choice.

George Rice (00:49:31):

Right.

Kent Holtorf (00:49:32):

It's crazy. I think they should open up drugs, buy them around the world, right? Just have one department just make sure they're safe and dah, dah, dah. Yeah, it's just—it's ridiculous. But anyways, whole other topic.

George Rice (00:49:50):

Right. [Laughing] Yeah. We'd probably have to have a couple of shots of whiskey to finish that conversation.

Kent Holtorf (00:49:57):

Yeah. We end up spending so much more, so much—I can go on and on—but it just goes to either the person who has the power to sell it to the distributors, and he gets 30% cutback right there. 30% higher to that guy. Anyways. It needs a lot of reform, but it's tough. Try to move the powers to be, it's scary. A lot of people are making a lot of money. Let's see what—I guess strategies we talked about to improve mitochondrial function and energy production. Anything

else that you want to talk about that, whether with mitochondria or not, some little key pearls for patients or doctors listening?

George Rice (00:50:58):

Well, I think a lot of providers already know this and they sense it and that's part of their frustration and they're looking for a different way, is in order for us to really optimize people's health, meaning taking you from being sick to getting balanced, from going to balanced to optimized, which is the other side of the coin. We have to do it in a different way. So we have to understand food as medicine. We have to understand that treating the root cause is the only way. We have to understand hormones. We have peptide therapy that can use your body's own natural abilities to thrive. So we have to get out of the—like you said—the one drug, one problem mindset, simplified mindset. Again, to just accept the complexity of the client. So to your point, that's why you need to get all those labs done. It's not just because we want to spend the money. We need to understand the client in their health context, they have their own unique health puzzle, and it goes together in their own unique way. We have to understand that. The only way to do that is to get a good picture. In my regard, mitochondrial function, fitness in hormones are significant pathways. So most of my clients, just with that alone, get to 70%, 80% of where they want to be. [Inaudible]

Kent Holtorf (00:52:36):

Yeah. I think balancing the hormones, give them a little thyroid, progesterone, so many things can be helpful. While peptides are a tool in the toolbox—they're a damn nice tool—.

George Rice (00:52:53):

Very nice tool.

Kent Holtorf (00:52:54):

But yeah. It reminds me, in terms of labs, I remember I went to the lab myself and the [inaudible] was like, "Oh, this is that doctor! [Inaudible]"

George Rice (00:53:05):

[Laughing]

Kent Holtorf (00:53:05):

I'm like, "Yeah. What do you think of him?" She goes, "I don't know whether he's the worst doctor or the best doctor. I don't know." And I said, "I heard he's awesome, and the cutest guy too." [Laughing]

George Rice (00:53:13):

[Laughing] Right.

Kent Holtorf (00:53:16):

So I was messing around with her. Yeah, she never knew. But they're not happy because they gotta draw all these tests.

George Rice (00:53:27):

Right.

Kent Holtorf (00:53:27):

But it's good for the patient.

George Rice (00:53:29):

It is. And that's what all this is about. It's not about the supplier supplying medication, it's not about the healthcare system and them bringing in enough clients to make money with procedures. It's about the client. It's about that one person, and that should drive all questions in all approaches.

Kent Holtorf (00:53:48):

Yeah. Again, patient focused, you know?

George Rice (00:53:51):

In of one, that's all it is. One person in this study.

Kent Holtorf (00:53:54):

That is. Have you found—I mean, of course we both read all the studies and I'll read a study like, "This thing is the best thing since sliced bread." And I tried and I'm like, "It's not that good!" I can't get it to work. So it's interesting how studies are important, but they can also be manipulated, you know?

George Rice (00:54:20):

It's true. Another point is the impact that epigenetics has, right? So that's a great point.

Kent Holtorf (00:54:29):

Good point. Very good point.

George Rice (00:54:31):

Because—you're right—I tried it and it did nothing for me and Kent, you try it and man! I mean, you put on muscle, you sleep better, you just feel fantastic, well why did it work for you and not for me? Does that make it a bad product? If I just do a study with you in it, it's gonna look great. If I do the same study with me in it it's gonna be negative. So it's not that the study is bad, it's understanding your epigenetics, your genomics. Right?

Kent Holtorf (00:55:01):

Yeah. Can you talk about the difference between epigenetics, genomics? Yeah.

George Rice (00:55:06):

Yeah. So genomics is really looking at understanding what your library, your DNA library is. Epigenetics is looking at the factors that impact how that library is interpreted. So, understanding your DNA—I think most people now understand that your genes are not your fate, just because you have the gene for insulin resistance or the BRCA1 gene that runs in your family.

Kent Holtorf (00:55:41):

I don't think most people know this. I think it's profound. Or the ApoE4, you know?

George Rice (00:55:47):

Right, right. So just because you have that gene doesn't mean you're going to get breast cancer or Alzheimer's dementia. However, it means that you have to live a particular lifestyle that doesn't activate that gene. Or, more importantly, you can tell that gene how to behave. So that's kind of a new concept, right?

Kent Holtorf (00:56:10):

Yeah. You can turn on and off. I was reading one study, and this was a small set of genes, but like Epitalon, another peptide, basically activated 147 genes and basically suppressed like 89 genes.

George Rice (00:56:30):

Right, right.

Kent Holtorf (00:56:30):

A lot of these—basically BPC, same thing, they stimulate the growth, suppress the inflammation, and all the bad genes.

George Rice (00:56:45):

[Inaudible]

Kent Holtorf (00:56:45):

[Inaudible] bacteria, huge, same thing.

George Rice (00:56:47):

Huge, huge. So that's, again, the beauty—we keep coming back to peptides—that's the beauty of peptides is that the peptides already understand the complex system. Meaning they go in, they know what to do. They know what to do in the liver. They know what to do in the brain, the heart, the gut, et cetera. There's no medication that we can make that can do that. We just don't have the knowledge to do that. So that's the beauty of the peptides is that it'll understand what your epigenetics is and actually change the community. So it's not about that one gene even, it's about how that gene is interacting with all the other genes in that area—[Inaudible].

Kent Holtorf (00:57:32):

Oh, yeah. We're so far behind. We look at one gene—how does this—but you need these genes to be active as well. We are so far behind. Then even the microbiome, just wait, we think how complex that is. Even more important is probably the virome.

George Rice (00:57:53):

Right.

Kent Holtorf (00:57:53):

All the viruses and the bacteriophages that control the bacteria. It's like exponential, you know?

George Rice (00:58:01):

It just opens a door.

Kent Holtorf (00:58:02):

Yeah.

George Rice (00:58:05):

So one approach is you can kind of go, "Woah, that's just way too much. We can't understand that." Right? Or just kind of look at what our bodies have already been doing and just let it do its job. So we can do that and we're closer to that. We're getting closer to understanding all this other stuff, but that epigenetic—understanding your epigenetics can make a difference. So that's why, for example, the ketogenic diet might work wonders for you. It doesn't work for me. In fact, if I go ketogenic for more than a month, I actually start putting on weight because I have the genetics, I have to have a certain amount of carbs to burn fat.

Kent Holtorf (00:58:48):

Yeah, yeah.

George Rice (00:58:48):

And for you, you don't. So ketogenic is wonderful for you, but that's the difference it can make. So if I have that genetics and here I am eating tons of fat and I happen to have ApoE34 or 44, what am I doing? I'm not doing myself any good.

Kent Holtorf (00:59:09):

Yeah.

George Rice (00:59:09):

So understanding your epigenetics, what to eat, why you need it. So it's not just enough to know that, "Yeah. I need some [inaudible] for my thyroid", but what about your glutathione and your hormone production and how does it work in your brain and your transmit?

Kent Holtorf (00:59:25):

Yeah, even extreme case, like ALS [inaudible] have a genetic defect. Well, we're finding we can shut that gene off.

George Rice (00:59:33):

Right.

Kent Holtorf (00:59:34):

Yeah. So great, I think that was one of the most profound statements right there that we've heard, and for people to remember.

George Rice (00:59:45):

Yeah. It opens a door for you as a provider, again, you're already doing it, right? But for providers who are getting into this, you can make a tremendous impact on a person's life. So, I used to work in the—I did work in the emergency department and I was on call and you probably know, how many thank you's have you gotten?

Kent Holtorf (01:00:10):

[Laughing]

George Rice (01:00:10):

Through medicine, right? So, yeah. I just intubated you and put you in the ICU and now you're awake 3 days later. "Oh, okay, great. When do I get to go home?" I've gotten more thank you's in this part of my career then I've gotten in the first part of my career.

Kent Holtorf (01:00:29):

Yeah. I did anesthesia for a bit and it was like, you save their life 10 times and you go back, "How are you doing?" Like, "I remember you!" You're like, "Yeah..." "You missed my IV!"

George Rice (01:00:44):

[Laughing] Right. Prevented your brain from shutting off and your [inaudible] too, but that's okay. That's okay! [Laughing] So yeah, it's really rewarding. The fact that you all are providing peptides and education opportunities for the providers, I think is huge because that's—I think that's what people look—other providers in particular are looking for.

Kent Holtorf (01:01:08):

So I think we're gonna restart our training program just so people get good training and not just money orientated. Well, I think it's a great interview.

George Rice (01:01:22):

Awesome. I enjoyed it.

Kent Holtorf (01:01:22):

Lots of amazing information, again, profound thoughts. And I really think, yeah, you're right! We have to get the epigenetic word out. I don't think many people know that, but it's such a key.

George Rice (01:01:35):

It is. It's very important. Well, it was great talking with you and—yeah, anytime you want to talk just give me a call. I've got lots of ideas I want to bounce off you.

Kent Holtorf (01:01:48):

Oh, no, I'm happy to. Yeah. I love talking with you and speaking with you and I think—thank you so much for sharing your knowledge.

George Rice (01:01:57):

Oh, absolutely. Anytime. The more people we can get on board the better.

Kent Holtorf (01:02:02):

All right. Thanks so much George.

George Rice (01:02:03):

All right. Thanks Kent, you have a great one. All right.