Genetics: Your Personalized Blueprint to Supplementation
Guest: Dr. Rudy Mueller

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Wendy: Hello, everyone, Wendy Myers here from liveto110.com. Anyone determined to be healthy takes supplements. So I brought together all the health experts for the Medicinal Supplements Summit because I'm committed to helping you experience vibrant health by making the right supplement choices.

Today we will be talking about customizing supplements based on genetic testing. We'll tell you all that you need to know and try to simplify this complex topic. Today my friend and special guest is Dr. Rudy Mueller. He is a functional medicine and human potential practitioner who, through witnessing his father's struggles and early passing, founded slimitless.com, an online company devoted to providing clients functional medicine services, including personalized genetic blueprints. His primary focus is on wearing out his two-year-old boy and being there for his loving wife. That's very sweet.

Thank you so much, Rudy, for coming on the summit.

Dr. Mueller: Well thank you for having me. I really appreciate being on this platform. I know you're working very hard. So congratulations on everything. It's coming together.

Wendy: Thank you. Yes, it is. And why don't you tell the listeners a bit about you and your story.

Dr. Mueller: Absolutely. So what really got me interested in functional medicine, and then eventually genetics and human potential medicine, was just what you mentioned earlier, witnessing my father's struggles with health. He experienced his first stroke when I was nine years old. And it was something that was difficult for both of us to go through. He was a little bit older than, I want to say, your average father is when they have a nine year old.

But his initial stroke, it was a really confusing time for me. And I watched him do the conventional medicine stuff, from prescriptions to imaging to all these different recommendations. And then within a few short years he experienced another stroke and then another one. And in the entire process, this process of watching him go through this, all I knew as a child was he was going to see the doctor.

He was doing what was recommended of him, yet the result was still the same thing over and over again. And it was decreasing his ability to function both mentally and physically. And I feel like I never really got that dad experience in the sense that I didn't get to experience his full potential when I was a child. And I certainly don't look for sympathy here or empathy or anything.

But that was really the start to realizing okay, something's broken here. And my own personal thing is as I started to see myself gain weight, start to not function as well mentally, taking a step back and saying, "Okay, what's going on here?" What are the factors that I can change so that I don't end up basically looking into the crystal ball of what my father went through, so I don't end up experiencing those same things when I have a child in the future?" I want to be there for him. So that was really the big motivation.

And then it just happened to be that when I was in chiropractic school, a biochemistry teacher handed me *The Textbook of Functional Medicine*. That kind of was like the bible for me at that time. It was like wow, this is where we need to be going with the future of medicine. And that's what got me into this.

Wendy: Yeah, well, tell us what initially fueled your interest in functional medicine and got you into working with genetics, etcetera.

Dr. Mueller: Well I think opening up that book, things just started to make sense. We're stepping away from this pill for an ill approach, this symptom approach, this diagnosis approach, and really starting to find out what are the underlying causes here and how do we address that. And early on in functional medicine it was me focusing on okay, what are the environmental

factors that could be creating these problems for myself, for patients, clients, etcetera? What are the lifestyle factors that need to be addressed? That's the major area, right, 80, 90 percent of it is all about the environment and the lifestyle.

And then that little piece, the 5, 10, 15, 20 percent, is the genetics. And so it was amazing to start to look a little bit further down the line here and start to say, "Okay, well from a genetic standpoint, what can we gain from the genetics to be able to then start to customize the lifestyle based on it? I really believe that the future of healthcare is all about personalized, individualized attention. And we're going to be throwing this average recommendation out the window.

Right now what we have in a conventional perspective -- you know it just as well as I do, and probably most of the listeners do as well -- that each consult's about 15 minutes. It's enough for a doctor to get out his pad and paper, hear one or two symptoms, go to his or her mental rolodex and say, "Okay, we need this recommendation for these symptoms or this diagnosis for these symptoms."

And I think that the best analogy that I heard, it's like joining a team. You get the diabetes jersey. You get the high cholesterol jersey. And what does that really get you? That just gets you this recommendation of something to address that high lab value or those symptoms. And so I think the future is all about okay, how do we individualize this approach? And my equation, the way that I talk about it with patients, is G times E and L equals U. So the G is the Genetics piece.

What do we know about genetics? How can we take these 600,000 SNPs that are potentially present in the body, map all those out, and then take the evidence based ones, the ones that we have a lot of the information about -- because it's still very early on in the science -- take that information, lay it out in front of you, and then knowing what the person's goals are, what they're trying to reach, whether they're going from having really chronic complaints or -- I hate the word complaints -- chronic concerns or diagnoses to bring them up to a functional individual?

And then that next level, which is really where I see the genetics taking off for people, is when they're doing well, and they really just want to have and enhance that effect and reach that higher potential or that pursuit of limitlessness, the Bradley Cooper [inaudible].

Wendy: That's what I'm after.

Dr. Mueller: Yeah, right. So the future is that equation. It's that genetics then looking at the environment. So what are the things that you don't really have control over but it's your environmental? So maybe it's the light that you're exposed to. And I think there's a lot of crossover between environment and lifestyle.

Lifestyle's the things that you really can control, the food, the water that you consume, whether you're around EMF waves, the supplements, the nutrients that you're taking, those types of things. And then you really get into the mindset. Do you believe in a higher power? Do you have a strong relationship with your family, with your friends, with your community, those types of things?

So that's the genetics, the environment, then looking at advanced biomarkers to be able to figure out okay, what is that interaction right now creating from a biochemistry and physiological standpoint? And then all of that equals you or what's called your phenotype. So I think that's the future right there.

I think the other piece to this is that looking at body measurements, like anthropometrics. So besides the waist to hip ratio, which is a great one, really looking into things like what is the appearance of the tongue? What are the earlobes like? What are the eyebrows like? What do the eyes look like, the toenails, the fingernails, these types of things with the measurement, circumference of the ankles, comparing one to the other?

They start to reveal more and more about the individual and what is occurring right now in their body that you can now take a step back and say, "Okay, now that we have the genetics, now that we have these factors, whether it's the biomarkers that are done through labs or these measurements, and their environment and their lifestyle, does this picture make sense? And then how can we really customize an approach specific to their goals," to what they want? And then be able to implement that approach with them. So it's like handing over an operating manual, like the blueprint, is what we call it.

Wendy: And it makes so much sense because everyone is so different. You need to look at your genetics to see what supplements are right for you or not. And the same with physicians, they need to be looking at genetics to see what medications work for people or not before they prescribe anything. And we have this technology right now. It's just irresponsible for any medical doctor who's not looking at genetics.

Dr. Mueller: Absolutely. And I'm so glad that you touched on that. The pharmacogenetics is what you're hitting on there, is knowing that information, knowing whether or not your body has the ability to detoxify these drugs, number one. Or do they hold on to the drugs and therefore you could potentially create or experience symptoms based off of toxicity?

Or do you clear those medications really, really fast and therefore the same dosage for you doesn't create any change in your symptoms? And so I think from a pharmaceutical standpoint, at least in my mind, it is all about how do we only use that for a temporary period of time. But as a consumer, if I needed a medication, I would really want to know what can my body handle and what can't it and what type of experience would I have if I ended up having to take that. So I think that's a great point.

Wendy: Yeah, it's so important because so many people are dying. It's the number one way people die in hospitals, is taking medication as prescribed because it's not being prescribed properly based on people's genetics.

So let's get back to the basics. So for anyone who doesn't know anything about genetics, what kind of tests do you do to test for genetics?

Dr. Mueller: Well, I think the most common one out there, the most well known, is through ancestry or 23andme. And 23andme.com is the simple saliva test that you can have done. Basically it's direct to consumer. So you can go on 23andme.com. You can pay the, I don't know, whatever the price is now, close to $200 or something. And you get a tube in the mail. You spit in the tube. You send it in.

And then that analyzes your SNPs. So now that you have this information, great. Now what do you do with it? Well, when I had mine done, I uploaded it into one of the different platforms, whether it's Genetic Genie or LiveWello or one of these other things that's all about interpreting those SNPs. And I uploaded it.

And we were getting information -- this is a few years ago -- mostly about characteristics. You're more likely to have this or that. And the thing that popped up for me is you're more likely to have male pattern baldness. So I knew I had to put a ring on that finger immediately. So it was interesting stuff. It wasn't that great. It wasn't perfect. But now we're starting to get a little bit more research around each one of these different SNPs.

So what is a SNP? I think that's kind of the basic information that we need to clarify. If you were to think about the way that a gene appears, right, a representation of it, it looks like a ladder that's been twisted, right? You're familiar with this, right?

Wendy: Yeah.

Dr. Mueller: So they parallel one another, and they twist up. And what you'll see are the rungs on a ladder. Those are a pair of what are called nucleotides. And nucleotides are adenine, guanine, cytosine, or thiamine. So you inherit one side from your mother, one side from the father. And it comes together. And those are your genes. And based off of the code, the code is represented by the first letter of each one of those nucleotides, so A, G, C, and T respectively, is basically the way that the SNPs lay out.

And so the way that I describe this to different clients is think about the word apple. And if you were to spell out that word you'd have A-P-P-L-E. And you would pronounce the word apple. Well a SNP is just a change or a variant in that normal code. So instead of it being A-P-P-L-E, we may have A-P-L-L-E. That is the SNP. That third letter in the sequence is the SNP. And you may pronounce that word different. So that's the outcome.

And so that's exactly what a SNP is in the code. The big one is the MTHFR. So maybe at that level the normal code that is present in the majority of people -- and I'm making this up; I don't remember the exact nucleotides -- is C-T. And so an alteration would be C-C. And so now that C-C affects the downstream pathway or the result in that biochemical process. And therefore a person may or may not have, like we talked about earlier with pharmacogenetics, the ability to detoxify. Or they may hold onto something more. Does that make sense?

Wendy: Absolutely, yeah, because I do detox with my clients. And some clients, they just can't detox because of their genetics. And other clients, the stuff just starts pouring out of them. And they detox just fine. Those are the people that are drinking and smoking every day and living to 110. They have genetics; they can do that. You probably can't.

Dr. Mueller: Yeah, totally. And I think that one of the things that people really need to understand is that everybody has these SNPs. What happens in my office, and you may hear this, too, because more and more people are having this testing done, it's like, "Oh, Wendy, I have the MTHFR." That's okay. That's all right. That's not a big deal. It's not a death sentence. There are ways to

work around it. But identifying and knowing these things is cool. Where we are right now is very much at the cutting edge. Now is there a lot more that's going to come? Without a doubt, more and more every day. There's more and more research coming out about these SNPS. And MTHFR is just one. It's a splash in the bucket compared to all of the information that we have now. And being able to now say, "Okay, here's what we need to recommend for this, that, and the other thing based off of these studies." So I think we're really in an exciting time.

Wendy: Yeah. So let's talk about looking at a person's genetics and how that can help them find out the right supplements for them. Or maybe give us some examples. If they have MTHFR, what supplements do they need, etcetera?

Dr. Mueller: Okay. So I think that the best way to kind of think about SNPs in general is have you ever seen *I Love Lucy*?

Wendy: Yes, I have.

Dr. Mueller: Okay, all right. And so do you know the episode that I'm going to be referring to here with the conveyor belt?

Wendy: Yes, I do.

Dr. Mueller: Okay, all right. So just to kind of give some context for those that may or may not know, it's Lucy and I can't remember her friend's name.

Wendy: Ethel.

Dr. Mueller: Ethel, thank you, standing at a conveyor belt. And the woman comes in, and she says, "Each one of these chocolates needs to be wrapped. And if it's not wrapped, you're both fired." It's kind of one of the last chances for them at this chocolate factory. And so as the chocolates are coming down the conveyor belt, they're picking the chocolates up. They're putting them in the wrappers.

Everything's going really smoothly for a few seconds. Then all of a sudden there are more chocolates. And then all of a sudden the conveyor belt speeds up. And now they're struggling. Now they're struggling to keep up. So Lucy's popping them in her mouth. And she's shoving them on the floor and saving them for later. And I'm certainly not doing this scene justice, so if you haven't seen it, definitely Google it because it's hilarious.

But the same type of thing is occurring in your body when you're looking at the biochemistry standpoint. You're having these reactions, quantum reactions and interactions going on in your body at any given time. So as is with the conveyor belt in the example, in order to reach that nicely wrapped piece of chocolate, we have many steps that need to be completed. And if these steps are not done correctly, then we have a faulty product, or we don't have the chocolates entering the box.

So on one end you have something mixing all of the ingredients to create the chocolate. On another end you have a conveyor belt or machine mixing all the peanut butter. And you've got the peanut butter coming onto the thing and the chocolate covering the peanut butter and then moving down to the wrapping. And then the wrapping into a box and the box being wrapped up and then sent out. So there are all these different processes.

Well, in the body it's the same thing. You have all these different biochemical pathways that are very much the same way. And SNPs can occur in these different pathways. And the SNPs will alter, maybe, the way that the chocolate is mixed. It may slow it down. And therefore it creates a problem later on. Or it may speed it up, as in what happened with Lucy in that episode, where their chocolates just start coming down. Now how do we deal with that? And what type of recommendations can we make based off of that?

So knowing that information can then start to reveal okay, what are the specifics that we need to do about it. So when you're looking at genetics and you're looking at this conveyor belt process, and you're looking at pathways like methylation or detoxification or ATP production energy, the more you look at the person's phenotype, so how are they appearing or presenting to you today, then it can start to clue you in.

But then once you have the SNPs, now you can make those recommendations. So, for instance, with, I don't know, cycling homocysteine to methionine, you may need betaine if you have a specific SNP at that level. And there are some other overlooked ones. MTHFR is called methyl tetrahydrofolate reductase. It's a SNP that, depending on which one of the two that they have, may require somebody to take a more absorbable and usable form of folate or folic acid. And so the methyl tetrahydrofolate is that easily absorbed and utilized form. So you may need that.

But what I think that people are missing in this is that they're only looking at that one. That's one of the common ones. Or they're only looking at COMT, which is another SNP that's responsible for breaking down catecholamines,

which is like stress hormones. And so we're only looking at the one. We're not looking at the whole pathway and how can we adjust that entire pathway. So personally, for myself, I have a MTHFR 1298, what is called homozygous, meaning that the code… so we talked about AC or ACT or G. Homozygous means it's the same code.

So it would be like AA. And that AA homozygous has a larger impact on my ability to utilize folic acid and my ability to use it. So I may need more methylation to be able to process that. Or I might need methyl tetrahydrofolate. Personally, when I supplement with that, even at a very low dose, I get heart palpitations. It's amazing.

But in looking at the entire process, I can see that every other part of that pathway is working very, very well from a genetic standpoint. So me just looking at MTHFR, I would've been supplementing with, depending on who's doing the recommendations, anywhere from 5 milligrams to 10 milligrams or even more than that, depending on who you're listening to. So that's how you can get more customized with it. Does that make sense?

Wendy: Yes, absolutely. And so for you, you're taking the methyl folate. And it's causing anxiety. And that's a very common side effect of people that are told by some practitioners that, "Oh, you have MTHFR. You need extra methyl folate." And they can't handle it because that's just not right for them. So it's not as simple as it may seem.

So let's talk again about the heterozygous and the homozygous, just to clarify that. So when you get your 23andme report or run it through MTHFRsupport.com or anything like that, you get the green, yellows, and reds. And those are homozygous, heterozygous. Can we kind of put that together for the listeners?

Dr. Mueller: Yeah, I'm glad that you have some knowledge of this so that we can break it down.

Wendy: Yeah, let's break it down.

Dr. Mueller: Let's break it down. Let's get down. So what we have is, as we indicated earlier with that apple spelling, A-P-L-L-E, the variant or the change is that change from a P to an L. So the variant is the "risk allele." And so that may be A, for instance. So that's the one that's not present in the majority of people.

And so that risk allele, if present in one out of the two copies, is called heterozygous, which may mean, for the MTHFR, as an example, you may have just a slightly reduced ability to utilize folic acid and convert it to the active form methyl tetrahydrofolate. If it's both copies, so AA, then it's considered homozygous. It's the same one, but you have risk allele present. In that latter example it would pop up red when you're looking at these different reports. In the prior example, when it's heterozygous, yellow.

And if it's normal, what the normal individual would see -- I say normal -- what the common example is, it would pop up green, showing that you may have -- and this isn't always a rule -- the normal function of that enzyme or the normal presence of that gene. And so sometimes, depending on what it is, a green may show that you have advanced capability to do something, or you may have slow. So it's not a perfect rule. But a majority of the time, red, yellow, and green are just like the stoplight.

Wendy: Yes. So yellows, you have slightly impaired function, given an enzyme or protein production; production of that protein in red, very impaired enzyme capabilities or protein production, correct?

Dr. Mueller: Correct.

Wendy: Yeah, so you're screwed if you're the red.

Dr. Mueller: No, you are. But I think it's really fun to be able to reveal to people that type of code. And like I said, it's not the be all, end all, but it certainly can reveal a lot to you about what types of things you should be taking. So if you're like me, Wendy, and you may be past this point, but as a practitioner, I'm always like, "Oh, that's cool. It's the newest, greatest thing."

And now I have a spinning cabinet that's got hundreds of different supplements. And this was all prior to doing the genetics. And then once I did the genetics it was like, "Oh, wow."

I think that's one of the most powerful pieces, too, is knowing it's not only what you should be taking or should be trying to take to see if everything works out but what you don't need to take. Is your vitamin A production great? Is your ability to absorb vitamin D from the sun and make it there? Or is that possibly taxed? And so you may need to supplement with some liposomal or oral vitamin D.

Wendy: Yes. And so can you give the listeners some examples? So we talked about MTHFR, and they might need methylfolate not folic acid. Can we talk a little about the differences there because a lot of people are taking supplements with folic acid in them, kind of the cheaper brands and whatnot? And can you explain how that's problematic for some people and why you maybe want to be thinking about taking methylfolate and other methylated B vitamins?

Dr. Mueller: Sure, we can touch a little bit on that. I think that the important piece is looking at the entire methylation cycle. So you're looking at MTRR. You're looking at MTHFS. You're looking at all of the different abilities. One of the other ways I explain it is looking at gears on a watch. You have the gears. The wheels are interlocking with the teeth. So you're looking at all of the different gears in that cycle and making sure that they're functioning okay.

So you get a trained practitioner to look at these things, like yourself or a functional medicine physician who has knowledge of it. And you're looking at the entire methylation pathway. And then you're looking at the phenotype, the symptoms that are being present and seeing okay, if they need to supplement with this, this is the route to go.

So for in the methylation, are you able to pull in folate and folic acid from your diet or supplements and be able to utilize it and handle it? And it's few and far between. At this stage of the game, from running hundreds of these different tests, it's very few and far between that you actually see that people are able to do that, number one.

So I hate to throw a generalization out there, because it's all about being specific to you, to the individual, but it's pretty safe to say that folic acid is not a great way to go for the majority of people. Some people can handle it. I have seen it, based off that interpretation, but it's few and far between, in my personal, clinical experience.

And so methylated form, having it at the most active form just makes sense, but starting out at a very low dose. And that's another thing that you'll see with some of these supplements, is that they are at a higher dose. Or if you go onto the, I don't know, the guru websites, they may start them off, like I said, at a higher dose, one, two, three, or even more. And so you really need to start low and slow. And you need to be methodical about how you introduce it. But with methylation, we're talking about your ability to detoxify. We're talking about your ability to make hormones, get rid of hormones. And those are

extremely important pieces of information to have and know what the result of having too much or too little of that process would create.

Wendy: And can you talk about how we need to be pretty careful? Say someone gets their 23andme.com report. They run it through Genetic Genie or MTHFRsupport.com. They get their massive printout. Can you talk about how people need to be cautious about taking that raw data and making supplement choices just based on that?

Dr. Mueller: Yeah, I think that there are a couple of things that people have come to me with. And there was a point where 23andme was, I guess, crossing a line, and the FDA kind of shut them down for potentially diagnosing. And so that's still in some of those websites. If you take that information and you go to different blogs and things like that, you're going to see these, I don't want to say, scare tactics. But you get worried, like oh, I have the increased risk for… in fact, one of them was, for me, ovarian cancer. I'm like wait a second. I'm a male. Or prostate cancer. So yes, those risk may be there. But it is all about the interaction of the environment and those genes.

So when people are entering in this information, they're getting these reports, I think one of the biggest problems that I see with this is that there are companies being generated from this where they're just printing out a generalized report around your diet, around your exercise. And it's really not specific to you.

Yes, it's taking your genes into consideration. But it's not looking at the big picture. And that's where having that trained eye, that person who's gone through that, is the time to really dive into those things. Is it okay to research the stuff online? Of course. But you just want to make sure that you're going through somebody that's knowledgeable, whether that be a functional medicine practitioner or integrative medicine or whatever we're calling it nowadays.

Wendy: Yeah, because it is difficult. When you said you have the MTHFR, say you have that mutation, there are all these other mutations you can have that affect that also. And so it gets quite complicated.

Dr. Mueller: It does. It gets very complicated. And it's complicated for practitioners too because it's constantly changing. And so they need to be staying up to date with it as well as being able to treat you well. And so from a standpoint of if you're going to do it on your own, just go low and slow. And be very, very careful and cautious of how you're implementing these things.

Implement one thing at a time, and watch and observe and be very tuned in. I think that that's the biggest thing. We're stuck with this paradigm of thinking okay, a pill will fix this. And it's not just about that. It's about all of the different environmental factors that could be creating this, from mindset to food to nutrients to supplements to toxins or toxicants, and knowing that full picture.

So when you're doing supplementation, you want to make sure that it's coming from the cleanest source. You want to make sure that it's being tested by third party testers to make sure that the quality of the ingredient is there, the amount, the quantity, is there that they're saying is there, that it's absorbable and utilized.

And I think that's the biggest problem when it comes to the supplement industry, is not that it's not regulated, but who knows where a lot of these places or these chemicals are coming from that are being put into your supplements. A lot of it is fillers. You probably know more about this than I do.

But the recent review of Sam's Club and these different places where people can buy massive amounts of vitamins for very cheap and what most people perceive as affordable. I don't want to pay for that supplement because it costs too much. Well, there's a reason why it costs money. It's because of quality. And so, I don't know, you get what you pay for when it comes to those things. So just be sure to implement safe, effective vitamins, supplements, nutrients slowly, is really where I would say that it's important to start.

Wendy: Yeah, so can you talk about some of the most common genetic defects and the supplements that one may need as a result of having that defect?

Dr. Mueller: Sure, I think one of the ones that I just saw on a client today was SOD2, superoxide dismutase 2. And so the SNP present there has been associated with cancer. It's been associated with chronic fatigue, motor neuron disorders. And so it's interesting because what that's around, as you know, is detoxification.

So I tend to see, when people are experiencing chemical sensitivity going into, I don't know, Macy's, and having a reaction to cologne or perfume or dealing with those types of symptoms, that there's a pretty good chance that they have SOD2. And SOD2 is all about how do we clear those toxins. So how do we neutralize them and clear them from their free radical state.

So having that knowledge, knowing that that SOD2 is present, now we know that we should be supplementing, not only avoiding the different areas that could create this toxicity or these symptoms, but also supplementing with vitamin C, glutathione and its precursors, like n-acetyl cysteine.

And then if it's present, SOD2, with another one, NAT2, then there are really some major issues going on. So how do we do that? Maybe IV glutathione is the way to go for you. Or maybe we need to supplement with different types of herbs to be able to help with that detoxification process, and then methylation and the cetylation, etcetera.

Wendy: I definitely have the SOD2 because I feel like I'm going to die when a lady with a cloud of perfume walks by me.

Dr. Mueller: Yeah, I know. I get it. It's tough. It's funny because people come in, and they're covered in perfume. And they're like, "I'm having a really hard time. I always feel so fatigued." It's like, "I can understand. You're knocking me out right now with the amount of perfume." But I think some of the other big ones, too, are when you think about the mitochondria and how they function, and you can picture the electron transport chain, your mitochondria are responsible for producing ATP and energy, among other things.

But that's one of the primary well known factors that the mitochondria are responsible for. And so they're meant to take electrons from your food or from your environment, transport it down through these different pathways, and then create ATP as a final product. And along the way they create different byproducts. They create oxidative stress or reactive oxygen species as a natural byproduct.

So when you look at mitochondria, you can look at a few different things to see is your ability to transport those electrons down that pathway efficient and running efficiently. And I think the big ones are NDUFS7, which is your ability to take the nicotinomide and bring it into the cell and be able to utilize nicotinomide for the electron transport.

And if there is a SNP present there, I'll often recommend NAD as a supplement. So if that's there, then that can help with the transport of the electrons through this chain. Another one, at what's called complex 4, which is just one of the areas along the mitochondria that's responsible for bringing electrons through, is the COX SNPs.

And I believe they are 5A and Cox 6C, so COX5A and COX6C. If there's something present there, then we're looking at possibly helping out with CoQ10. We're looking at ATP synthesizers. PQQ can be another one which helps with mitochondrial biogenesis or the production of more and more mitochondria. So that's getting into the mitochondria. And then if you're having excessive oxidative stress or decreased efficiency of producing electrons, then there are some other things that we can dive into.

Wendy: Any another examples, any juicy examples you could think of?

Dr. Mueller: Yeah, I think one of the big ones is the vitamin D, though. So I'd like to hit on that if I could. So with vitamin D, right, we naturally make it from exposure to the sun, which unfortunately a lot of us don't get enough of that, even in the summertime. But there are three major ones, SNPs, that I think about when I'm looking at vitamin D. They are VDR, which stands for Vitamin D Receptor, and then the suffixes, FOK, the next one is BSM, and the next one is TAQ. And looking at these vitamin D receptor SNPs can reveal some important things. So for the first one, the FOK, if you have that SNP, mostly homozygous, you may need increased serum levels. So when you're getting your blood test, I think around 30 to 80 or 30 to 100 tends to be their normal range, although ideally we like to see it up at 50, 60, 70, 80, really. But when you have levels of vitamin D that are low, and you have the VDR FOK, you may need to get exposure to the sun as well as doing oral supplementation. So we want to have higher levels of vitamin D in the blood than what would be within that normal range because your body's not able to utilize it as well when levels are lower. So that's one example for the FOK.

The example for the BSM is you have increased conversion of the vitamin D 250H to its breakdown product. Therefore toxicity may occur. So supplementing with the vitamin D may result in toxicity. So you really need to be aware of where your levels are.

And the VDR TAK, you may have decreased conversion of sunlight to vitamin D. So you may need to spend a little bit longer out in the sun. Or, if you're living in the northern hemisphere, like I am in Maine, you want to be supplementing with it as well. So those are some of the big examples when it comes to vitamin D.

Wendy: And I think a really good insurance policy is just to go in the sun, get your sunlight, no matter what your genetics are. I have a big problem with those blanket statements, "Oh, everyone needs vitamin D." No, some people take it, and they have toxicity. They have increased inflammation in their

body. You have to do testing, the 125 hydroxy and the 25 hydroxy, the active and free form of vitamin D, and find out what you need. Most doctors are only doing one test. And it's not adequate enough. And you've got to throw in that genetic component to really see how you're metabolizing any potential D supplementation. There's regular vitamin D, and then there's liposomal D. What are your thoughts on that?

Dr. Mueller: I'm going to actually let you handle that one there. I use liposomal because I find that people react and were getting better absorption and better labs with it. But that's just a preference of mine because I saw results. But I really don't know the science behind why besides the fact that it's liposomal, so it's a fatty acid. And so therefore putting it into a fat to make it reabsorbable makes sense.

Wendy: Yeah, I'm personally more towards liposomal supplements. You get much higher absorption, so why not.

Dr. Mueller: And I'm seeing that. So I didn't know if you were looking for something more than that. But I am seeing that clinically as well. Liposomal glutathione's another one that I've seen more and more of, although I'm not measuring glutathione levels.

When I do do an oxidation panel through Genova, or we're looking at how well a person is handling different oxidation processes, then I'm able to see some slight changes with that. But another big one is an herbal supplement that's got Bacopa. I'm so sorry, I'm not remembering this. But anyway, I'm seeing some big results from it. And it's an herbal compound. And it's improving oxidation. Protandim, that's the name of it.

Wendy: Okay, yes, Protandim.

Dr. Mueller: So I've been seeing some great results with that as well.

Wendy: The little blue bottle, it's in a little blue bottle.

Dr. Mueller: Yeah, it's really cool looking.

Wendy: I forget the manufacturer.

Dr. Mueller: Very good marketing.

Wendy: I forget the manufacturer. But it's a really good antioxidant.

Dr. Mueller: Yeah, they're doing great things. I'm seeing great results with that as well. So that's what it comes down to, is the quality, right, finding a good quality supplement.

I think one of the other things, though, that's exciting, and maybe you have somebody talking about this, is really the therapeutic benefits of different probiotics and where the technology or research is coming in with that. You're going to be able to get some really targeted benefits based off of what probiotic you're recommending. So you talked about that blanket statement earlier of everybody needs vitamin D.

Well, what's the other big blanket statement? Everybody needs a probiotic. And yes and no, it depends. What are you eating? What are the goals of the person? Is the person struggling with symptoms, as we indicated earlier, and wants to get up to "average" or doing well?

Or do they want to exceed that, and they have specific targets that they want to get into? And I think that that's where the genetics really helps, is getting that person from that state of functioning, we're doing okay, but we really want to take it to the next level because that is the ten percent that we were talking about earlier. But I think probiotics are exciting.

Wendy: Can you talk about some of the pitfalls in using genetic data to recommend supplements? I know they've got some programs out there. You can put in your 23andme data, and then it spits out supplements you should take or avoid. Any issues there that you can speak to?

Dr. Mueller: Well, I just think it comes back to what we hit on earlier, that you need to be with somebody that's a trained professional to go through this type of stuff because these generalized blanket recommendations, even though you have some SNPs, they're not looking at the full picture. They don't know the environment that you're in. They're not questioning you about your lifestyle. They're not looking at your parents' health and what was the result of it, if we know that. They don't know if you were breastfed or if you were born vaginally. They don't know those types of things.

So it's still this blanket recommendation, just like medication was in conventional medicine, the, "Oh, I have these symptoms." "Okay, here you go. Here's the medication." It's the same thing. You have this SNP, so, "Here you go. Here's the supplement. Here's the dosage." I think we're still getting in dangerous territory with that. Like I said earlier, the genetic stuff is still in its infancy, very much in its infancy of the knowledge that we know.

Now, some of it is very exciting. But it still takes a person looking at all of the different SNPs that are present in a pathway, your environment, that equation, the phenotype, and then being able to say, "Okay, here's what we need to do." So the big thing, too, is that we don't know, without looking at that whole picture, whether or not that SNP is actually turned on or that gene is actually turned on.

And so these blanket recommendations aren't looking at that. So therefore they don't know if that SNP is actually being expressed. It's just showing that it's there. There's no testing to show oh, yeah, it's being expressed. And therefore we need to address it.

Wendy: Yeah, that's the issue I have with some of these genetic tests and interpreting them so literally, is that they don't factor in the epigenetics, where your diet and lifestyle turn them on or off. And if it was turned on at one point and you improve your diet and lifestyle, it gets turned off.

Dr. Mueller: It's the art. It's the art behind what we're doing, behind what all of the speakers on this summit are doing. It's the figuring out that individual and figuring out that person and customizing it based on them, the person that sits in front of you.

Wendy: Any other thoughts on genetic testing and supplementation or anything else that you want to add?

Dr. Mueller: I think that the most important thing if you're listening to this and you're listening to the different experts on this project, is that when it comes to supplements, they're very, very therapeutic when they're done in the right way. And they can be very helpful. And the first thing that you need to address is your life style and what you're doing, how you're thinking, what you're putting in your mouth from a food perspective, are you getting the proper light exposure from the sunlight.

And start to mitigate some of the things that are common to everybody from an environmental standpoint, like the wifi, the exposure to these different electromagnetic frequencies. And then as you're doing that, you can protect yourself from these exposures with the different supplementation.

And getting back to the paleo days, it's a great recommendation. It's a good starting point. But in reality, the majority of us live in an environment where we're not able to get back to that. We never will be able to get back to that. So that's why I believe supplementation is necessary for each person. It's just a

matter of it being specific to you and what you're able to do. If you are able to go live in a teepee 50 miles away from any cell tower and everything like that, supplements, you may not need them. You may not need them. But if you're living in the modern industrialized world, supplements are probably going to be a thing that are going to help you, whether it's get back up to functioning or even enhancing your functioning.

Wendy: If someone's interested in learning more about genetic blueprint analysis, where can they contact you and learn more about it?

Dr. Mueller: So there are a couple of different sites. If you want to look for a practitioner that's near you, you can go to genomicguru.com. There are only a few practitioners right now that have been trained through that website or through that practitioner, Dr. Daniel Stickler. And then if they were interested in learning more and want to do a virtual consult or something with me, they can check out slimitless.com. And we're currently updating our website. So hopefully everything's functioning really, really well if you go visit it. It's slimitless.com.

Wendy: Yeah, it's a never ending process, redoing your website.

Dr. Mueller: That's for sure.

Wendy: Well, thank you so much, Dr. Mueller. I really appreciate you coming on the summit. And you did your own summit, correct?

Dr. Mueller: I did, yeah. I did the Forget Weight Loss Forever Project in March. And man oh man, I know where you are right now. At the time we're recording this, we're a few weeks away. And I'm so excited for you. It's such an amazing process. And to hear how many people you have helped, just having testimonials, it's unbelievable. So I'm really excited for you. I'm really looking forward to hearing the response from everybody.

Wendy: Yeah, I'm excited too. When I conceived of this summit, there had never been a supplement summit before. I'm like, "Why hasn't there been one? Well I just need to do it myself." And I love supplements. And I'm very passionate about high quality supplements and customizing to you based on testing. And that's what I wanted to communicate to everyone. That multi vitamin you're popping every day might not quite be enough.

Dr. Mueller: Right, and customizing is great. And having the testing to look at those types of things is perfect. And that comes from testing metabolites to

testing the actual immune cells through SpectraCell. So it's fun to be able to hand somebody that customized supplement or that vitamin plan or the plan based specifically on them. So you getting this knowledge out there is definitely well overdue. And it's exciting to be a part of it. So thank you.

Wendy: This is Wendy Myers. And my hope is that you and your family experience the health that you deserve, and that all begins with taking the right supplements for you.

If you like what you heard, you can purchase all the expert talks from the 36 additional speakers on the Medicinal Supplements Summit at medicinalsupplementssummit.com. You can tune in to listen to talks from Mike Adams of naturalnews.com, Dr. Daniel Amen, Sayer Ji, Andrew Saul, Katie The Wellness Mama, Dr. Peter Osborne, Dr. Tom O'Bryan, Dr. Amy Myers, and so many more amazing speakers.

This online summit is dedicated to educating consumers on healthy supplementation and the latest in supplement customization testing. And in this landmark summit you're going to learn what supplements are right for you and your health issues, how to take supplements the correct way, why you want to avoid cheap supplements that don't absorb, avoiding supplements with harmful ingredients, the best tests to customize supplements to you, and the best forms of these supplements to take -- that's really, really important -- and the best brands suggested by the world's top health experts, what they're using in their practice and what they recommend and take themselves. Learn more at medicinalsupplementssummit.com. Have a fantastic, healthy day.