



Transcript of “Mitochondria, Health, and Vegetables with Dr. Terry Wahls”

Bulletproof Radio podcast #120



Warning and Disclaimer

The statements in this report have not been evaluated by the FDA (U.S. Food & Drug Administration).

Information provided here and products sold on bulletproofexec.com and/or upgradedself.com and/or betterbabybook.com are not intended to diagnose, treat, cure, or prevent any disease.

The information provided by these sites and/or by this report is not a substitute for a face-to-face consultation with your physician, and should not be construed as medical advice of any sort. It is a list of resources for further self-research and work with your physician.

We certify that at least one statement on the above-mentioned web sites and/or in this report is wrong. By using any of this information, or reading it, you are accepting responsibility for your own health and health decisions and expressly release The Bulletproof Executive and its employees, partners, and vendors from from any and all liability whatsoever, including that arising from negligence.

Do not run with scissors. Hot drinks may be hot and burn you.

If you do not agree to the above conditions, please do not read further and delete this document.

Dave: Today's cool fact of the day is that lachanophobia is a condition in which someone is intensely afraid of vegetables. The root word means vegetable in Greek. Not much is known about that phobia, but it's possible that George W. Bush was a lachanophobe because in 1990, he banned broccoli from Air Force One.

Today's guest is a friend and a former guest on the show, Dr. Terry Wahls. She's a clinical professor of medicine at the University of Iowa with more than 60 peer reviewed scientific abstracts, posters, and papers. In short, she's a real doctor and a real researcher. What really helps her stand out is that she gave a TED talk and just published a book called [The Wahls Protocol: How I Beat Progressive MS Using Paleo Principles and Functional Medicine](#).

This is pretty hardcore stuff. Terry was in a wheelchair and nearly disabled from MS, and used a high fat diet, which we're going to talk about today, along with tons of vegetables to reverse her symptoms, and even some electrical stimulation. I have met with Terry multiple times in person and she walks around. You would never guess that she had MS and was wheelchair-bound. Terry, welcome to the show and thanks for coming on again.

Terry: Thank you so much for having me.

Dave: How long ago were you in a wheelchair?

Terry: In 2003 is when I made that transition. 2007, I was still in a wheelchair. Began the interventions. By 2008, I was out of the wheelchair, walking with a cane, then walking without the cane, then biking 18 miles.

Dave: That is remarkable. In just about four years or so, you reversed what has been going on for a long time.

- Terry:** In just one year, I went from struggling to walk 25 yards to being able to walk with two canes, two walking sticks. In about six months of my protocol, I was walking with a cane very comfortably. Then walking without a cane. In a year, able to bike [about 02:27] 19 miles. I've continued to slowly improve. This last weekend, I was on the treadmill. I'm very excited about this, Dave, because I was at 4 miles an hour for 20 minutes. Covered a mile and a half at a slow jog or a brisk walk, and between the two. It's thrilling. I'm quite hopeful now within another year I'll be able to job pretty comfortably.
- Dave:** Is jogging a good, useful form of exercise?
- Terry:** Actually, I think intervals are much better. I do interval work and weight training. Being able to jog or run again, it just feels miraculous.
- Dave:** I can't imagine after having been in a wheelchair like that. Maybe in small relationship, I always had flat feet and terrible pain. I had arthritis in my knees when I was 14. I didn't know you were supposed to be able to walk without it hurting. I just thought that was part of walking until I was about maybe 20 or so. I got orthotics. For the first time I was like, I walked across campus and it didn't hurt, just because it was outside my universe that you could move without hurting. I imagine it must be about a thousand gazillion times more when you get out of a wheelchair for the first time.
- Terry:** Since I had progressive MS, my physicians have been very clear that functions once lost never return. In my process of coming to terms with my illness, I had accepted that that would never come back. I was just going to get progressively more disabled [inaudible 03:57] become bedridden. When I started my intervention, my goal was simply to put that off a few more years if I could. I had no idea that I was going to recover and walk again easily, bike again, and now even jog.
- Dave:** It's so remarkable. How did your family respond when you suddenly stopped declining, even though all of medicine said you were going to continue? What was it like for you? I don't think you covered that so much in your book.

Terry: We'd all accepted that I had progressive MS and things were going to get steadily worse. It's interesting for all of us. I [inaudible 04:37] get remarkably better. I'm walking around the neighborhood without a cane. We were all still not sure what to expect.

I remember the day that I decided I was going to try riding my bike for the first time. I put my helmet on, I was rolling my bike out. The family all rushed out, grabbed the bike. We had this family meeting, could I try riding my bike? My kids were terrified. They're crying. They're really upset. They're afraid I'm going to get hurt. Fortunately, Jackie says, I think this is going to be okay. She told Zack to run on the right side, my daughter to run on the left side. She would follow on her bike. I got on the bike and biked around the block.

At the end, we're all crying, sobbing. That was the first time that probably my kids and my wife realized things really were changing. That we didn't know what was going to happen and quite possibly, I was going to continue to recover and get close to normal function again at some point. That was a very, very big day for us.

Dave: A lot of our listeners don't have MS. Actually, some percentage of them are bound to get it and don't know it because it's a neurodegenerative disease and it takes 10 plus years from when you might first have some autoimmune stuff happening. If you don't know you're one of those people, how does what you did, which is superhuman, honestly, how does that apply to a normal guy?

Terry: Actually, it's very interesting. In my clinical research lab, I have a lot of undergraduate students who volunteer in the lab for experience and credit. One of the requirements I have if you're going to work with me is you have to adopt the diet for at least two weeks. You keep food logs. You turn them in. If you actually do all of that, then I'll say okay, we'll let you join the lab. These kids in their mid to late 20's, in their prime, are quite surprised with how much more energy they have, how much clearer their thinking is, with this two week change. Several kids have discovered that their migraines have gone away.

Dave: Magically?

- Terry: Their aches and pains, stiffness, have gone away. The vast majority of kids become converted. I had no idea I could feel this good. Even people who think they are well often discover that they were just sort of mediocre and suddenly, their energy and mental clarity is vastly better.
- Dave: One of the goals with a [inaudible 07:23] diet is to just get people for one day to feel that way. I think as you've experienced with your students, when people get on a diet with the right nutrients and a clean diet, and we share a lot of common philosophies and recommendations, that once they feel that, why would you ever want to feel like what used to be normal for you again? It doesn't matter how old you are.
- Terry: I think a good way of thinking about this that I try to explain is it's like seeing the world either in black and white or color. Once you see color, who wants to dial back to black and white? Once you experience full health and vitality, why would you like to go back to feeling exhausted and befuddled again? No one does.
- Dave: Did you ever use modafinil or Provigil to try and get your energy up?
- Terry: As a matter of fact, I did [inaudible 08:09] like most people with severe MS fatigue, they gave me Provigil. First 100 milligrams, then 200, then 300. It didn't do a lot, but the small amount that it did, I was very grateful for it. Yeah, I stayed on that. If I go back to 2007, I started everything in November. In February, I realized I just was not sleeping. Then fortunately for me, Jackie said, Terry, why don't you stop the Provigil so you can sleep?
- Dave: It is an anti-narcolepsy drug, so if you're getting into 3 or 400 a day . . .
- Terry: I stopped that. I slept well. My energy continued to be great. In April, I called my neurology doctor. By this time, I had been walking around fine without my cane. I tell them there's been a change. I should probably see him. I'm over there in the waiting room. His nurse is walking around with a chart, looking for people. I'm thinking, I bet she's looking somebody in a wheelchair, doesn't realize that I'm not in it anymore. I stand up and go, hey Cindy, over here. She looks at me. Her jaw drops. Dr. Wahls, oh my god. What's happened?

I walk in, see her, see my neurologist. He is incredibly impressed and very excited by the changes. He of course was thrilled that I stopped the Provigil. At that time, we talked about slowly tapering my disease-modifying drugs, which we did. We have the Cellcept four week, then have it again for another week, and then I was off. I've been off that since 2008 and I've done extremely well.

Dave: The reason I was asking is we're about to start talking about mitochondria. I was on Provigil for eight years. I didn't have MS. I had Hashimoto's thyroiditis, which I had cured. I certainly had some autoimmune conditions brought about by toxic mold exposure and some other things. I was pretty darned unhealthy, you could say.

I was on Provigil for about eight years, when you talk about just being tired and fatigue and all. I've largely gone off of it. It was something that was a daily thing. What sparked that was when you said it was like living in color or black and white. When I didn't understand the principles behind how to eat properly, I felt like I was always in black and white. Then I'd take Provigil and then the colors would come back, like that scene in, whatever, Alice in Wonderland, the original movie, where suddenly, everything wakes up.

You just triggered that memory for me. It's interesting that you did experiment with performance-enhancing substances like that and got some benefit. But you're not on it now and look how you're performing. It's amazing.

Terry: The real performing medicine, food.

Dave: I know. That old Hippocrates . . . was it Hippocrates? Let thy medicine be thy food?

Terry: Yes, absolutely.

Dave: You are a white lab coat-wearing university professor. You're one of those doctors who obviously doesn't get it because you're a doctor. There's almost a backlash against western medicine, but you are not part of that backlash. What do the other more straitlaced, conservative

physicians say when you say food is medicine? It almost flies in the face of what the drug companies are preaching.

Terry: Because I'm also a researcher. I write grants, get funding, do clinical trials. Every year, we have two research days, one for the department of medicine, one for the college of medicine, where my lab presents our data. My colleagues have seen the progress with other progressive MS folks and the remarkable results that we are showing. Physicians, scientists, we love data. We like to give each other a hard time, of course, but it's very exciting. More and more people are coming by. Now that we have videos before and after the gait changes, people are very excited, very thrilled. I'm going around to various departments at the university giving research seminars, going nationally and internationally to present our research.

Dave: That is so cool. I just want to say thanks because when you can get people who are in a position to help so many people like physicians are to bring the food side in with the hardcore medical physiology, biochemistry, and pharmacology that they're trained in. To bring all that together, it seems like as a biohacker, I'm not opposed pharmaceuticals, hormones, exercise, food. Whatever the tools are that help me to improve a system. For you to take the credibility you've earned throughout your career and then to help apply that to helping other medical professionals help more people, thank you. We just need so much more of that, so keep it up.

Terry: Right. It helps that I talk about chemistry, physiology. We talk mechanisms. I have more basic scientists asking to join my lab because they know I have all this frozen blood and these very interesting results. People are now talking and pitching ideas as to how we're going to analyze our frozen [serum 13:39].

Dave: That's even cooler. Do you have access to the military blood? I think it was Tom O'Brien from the Gluten-Free Summit who was on the show who was talking about how they looked at autoimmune markers going back 20 and 30 years from the military samples that they get from draftees.

Terry: That would be very, very interesting to get access to that, writing of the grant, getting funding, proposing, etc. That's more of a basic scientist's. I would find one of my partners to do that. I do this radical thing known as seeing patients, intervene with people, and seeing what happens over time. Then I get my basic scientists who are the lab rats to analyze the bloods to figure out the biochemistry and the physiology.

We're talking about Zuhair Ballas, who's the chair of allergy immunology. He and I are planning what are these cytokine analyses that we'll be doing on the blood. That's going to be really very, very interesting to get this detailed immunologic analysis to see how things change as the year progresses on our [study 14:48] diet.

Dave: I have to ask this, and I apologize to all of our listeners in advance because most people don't know about this. Melanocyte-stimulating hormone, or MSH. Are you looking at that by any chance?

Terry: Yes.

Dave: That's part of the new Bulletproof Diet book. I have a little bit in there about how diet affects MSH in the gut, so that's cool.

Terry: We have not yet finalized our panel. We have to sort out what we can do within our budgetary constraints, so I'll have to get back to you on that.

Dave: My MSH is low, which happens when you have the genes that 28% of us have and you're exposed to toxic molds through breathing it. It's funny. I just got my test results back. I've known for years because of symptoms that I was low. I'm actually treating that now and we'll see what happens.

Terry: Interesting. I look forward to hearing more.

Dave: Again everyone, I apologize. Sorry. I just have to ask these questions when I get an awesome expert on the phone. Let's talk more about mitochondria. Would you give an overview of what is a mitochondria, what is ATP, for people who are listening?

Terry: Sure.

Dave: Then let's talk about how you hacked yours and how other people might be able to hack theirs.

Terry: We're to go back 1.5 billion years. The Earth's covered with a terrible poison which is killing off large swaths of life. There are a few bacteria that have adapted to this toxic poison. They've learned how to use the poison, oxygen, more efficiently in generating ATP. These ancient bacteria are engulfed by other bacteria and they develop a symbiotic relationship.

This new bacteria will evolve over time to become animals and eventually us, of course. That means all of ourselves have these ancient bacteria that help us generate adenosine triphosphate. Our mitochondria are really bacteria. In the most energy-intensive cells, our brain, our retina, and our heart, we have about 10,000 mitochondria per cell.

In medical school, I had to memorize lots and lots of [reactions 16:54] involving my mitochondria, but no one taught me what I needed to feed my mitochondria to be sure that they could have optimal function and from what kind of things were particularly toxic. That's one of the things that I investigated as I figured out from my reading that likely, mitochondria were the root cause of my fatigue, my brain fog, and the atrophy or shrinkage of brain tissue in MS, Parkinson's, Lou Gehrig's, Huntington's, all these neurodegenerative processes.

With more reading, study, I figured out that I needed all the B vitamins, zinc, magnesium, sulfur, antioxidants, and essential fats because the mitochondria have lots of membrane around the cell and within the mitochondria to run that chemistry. They're also incredibly dependent on omega-3, omega-6 fats. You want to flood your body with that nutrition so your mitochondria can perk up and come back to life.

It also means you particularly need to protect them from heavy metals, aluminum, arsenic, lead, mercury being the foremost toxic.

Dave: Would you say that if someone potentially was at risk of getting MS . . . or everyone is at some risk, but someone maybe has it in their family,

that by maybe feeding their mitochondria a little bit better, avoiding some metals, detoxing regularly, are they going to improve their odds of just not getting sick?

Terry: I'll tell you. If you have a sibling with MS, 5% risk, parent, 3% risk. Two parents, 30% risk. Always your diet and your environmental factors are 95 to 70% of your risk. To that end, nutrient-dense diet, detoxing is profoundly, profoundly helpful to make sure you keep a healthy, vital brain and healthy, vital mitochondria. That really goes true for all these complicated chronic diseases that many of my colleagues erroneously let their patients think it's my DNA. I was just destined to get heart failure, or diabetes, or obesity, or obsessive-compulsive disorder, or whatever, when it's really probably at most 5% genetic and 95% nutrient density of your diet and your toxic exposures.

Dave: When I say detoxing, a common response I get from the skeptic crowd online is [inaudible 19:40], there's no such thing. Detoxing, there's no such thing. Your body has natural detox systems and all that. Why do you focus so much on detoxing? We do have livers. We do have kidneys. We have skin. We secrete toxins. What's different?

Terry: Those definitely are the organs that are going to process and eliminate the toxins. But in order to do that, that's still a biochemical process that's dependent on having the proper substrates. So you can induce those enzymes, up regulate them, particularly if you have a lot of sulfur-rich vegetables, which is why my protocol stresses the sulfur-rich vegetables. That's going to really amplify your ability to detox. If you don't provide those systems the proper substrates, they're not going to function very well. The toxins, instead of being excreted, will get placed in your fat and in your brain, where they ramp up the inflammation, ramp up the neurodegeneration, and lead to progressively more damage.

Dave: In a lot of the work I do with Bulletproof clients, coaching work, for people who don't have MS, don't have chronic diseases, but they just want to perform better, similar recommendations seem to work remarkably well. People who think they're and by all measures are well, when they add the sulfur-rich vegetables, they eat a lot more vegetables.

They take the vitamins and all of the things that increase mitochondrial function. The two things I focus on most are mitochondrial function and inflammation. If you can get both of those, one up, one down, magically it seems like normal people become gifted with strange abilities they didn't know they had and sick people become well. Is there a set of people where this doesn't work? Or is this a universal thing we should all be doing?

Terry: I would say this is a universal thing. We're biochemical beings. Life exists because of self-correcting chemistry. That actually keeps the concentrations of minerals at a very narrow range in the cell, out of the cell. If we get too far out of whack, you die. Our bodies, as well tuned as it can be, given the substrates that we give it. As a result, as we ramp up that nutrition, that self-correcting chemistry gets healthier, healthier, and healthier. Your health continues to improve. You tend to continue [euthin 22:11]. Obviously, you'll begin aging again at some point. But very typically in my clinics and our clinical trial, people [euthin 22:20]. It looks like they [euthin 22:22] for about 10 years and then they begin to age again.

Dave: My own experience is that I certainly have more energy, more performance, more focus than I did ever in my 30's and I'm just over 40. It's remarkable. Even things like skin quality and things like that are better than they were, and some of the other markers of aging, like there's a heart rate variability thing that predicts your age reasonably well. I score younger than I actually am. I'm certain that the fact that I've been, quote, "minding my mitochondria" for more than a decade and doing everything I can think of to make my myelin stronger seems like it just helped, even though I didn't have MS. Who knows? Maybe I was on that path. It's very hard to predict.

Terry: When you look at chronic disease on a molecular level and a cellular level, what we see, Dave, is that it's all the same disease. You have mitochondria that are not working well, too much oxidative stress. You have inflammation that's inappropriate and attacking the self. You have nutrient deficiencies. You have toxins that are present, revving up the inflammation. We see that whether it's an autoimmune condition, whether it's a mental health problem, whether it's a neurodegenerative

problem. Schizophrenia, obsessive-compulsive disorder, MS at the molecular level are surprisingly similar. That is why if we treat people at the cellular-molecular level to address those broad categories, health improves.

It makes clinic vastly easier. I make a diagnosis. I [give 24:07] my prescriptions to take care of the acute problem. Then I make diagnoses of the nutritional adequacy, the probability of mitochondria's function, [inaudible 24:17] this inappropriate inflammation, and the toxic overload. I address those problems, and it's a pretty straightforward addressing for whatever the underlying condition is, and help and coach people with these lifestyle changes. They come back every month with more and more energy, more excitement, more vitality. They're so grateful for getting their lives back.

Dave: It's certainly been my experience when I was 100 pounds overweight. I felt like I got my life back. I see this quite often with Bulletproof people who aren't treating medical conditions, but we all want to live more life. I'm sort of sad that when I went to the doctor many years ago and said something's wrong, I can tell something's wrong. What do I do? The answer was like, I guess you should eat healthy and lose some weight. I'm like, why didn't anyone tell me the kind of things that you're telling people? Granted, we know a lot more now, but you're still at the forefront of getting the word out there through medical professionals.

Terry: You know what? It's interesting. I've taken an unusual approach. I'm doing the clinical research, writing grants, writing papers, and going down the academic route. I care so much about the world that I'm also teaching the public, doing TED talks, creating a website, writing books, and giving the public the same tools that I'm researching and letting them know here's the science behind why I've designed it this way and why I'm doing the science this way. The public can decide, okay, looks safe, I'm going to give it a try. Or they can say well, you know, I think I'm going to wait for a few more trials, FDA approval, and they can sit back.

More and more of the public are ready to evaluate science simultaneously and take these very common sense, very easy . . . Behavior's not an easy thing to change, but far easier than taking

chemotherapy or disease-modifying drugs that are going to shut down your immune system and give you life-threatening side effects. That could let you get your life back from an autoimmune condition, or a serious psychiatric problem, or a severe diabetes, obesity, and heart disease. Things that are completely under their control.

Dave: I'm grateful that you're helping people directly and doctors. One thing that not a lot of even paleo people talk about as much, but you talk about because you're a physician, is myelin. I've been particularly fascinated with the types of fats in myelin and I'm working on some new ways of increasing myelin strength. Because you had MS, I know that you would know a lot about myelin. Can you talk about what this is and why people who aren't sick should care about the state of their myelin?

Terry: I'm going to go back even a little bit further. All of our cells are wrapped in a cell membrane, which is made of fat. That fat's going to include saturated fat and cholesterol, about 70% omega-6 fat, omega-3, in about the three to one or four to one ratio. It's critical that those cell membranes have plenty of saturated fat, plenty cholesterol, plenty of omega-3 and omega-6 because the cell membrane is how our cells communicate with the world and the cell functions.

The myelin is that cell membrane wrapped around and around and around and around and around and around, so it is a very dense layer of fat. Saturated fat, cholesterol, omega-3, and omega-6 fat. It makes me completely sad and crazy when people are talking about a low fat diet for somebody who has a myelin problem because myelin is made of fat. You need to have saturated fat, you need to have cholesterol, to make that myelin. You also need omega-3 and omega-6 fat as well.

Dave: You need undamaged fats, not deep fried omega-6 and saturated fat.

Terry: [inaudible 23:32] fats. I talk about this a lot in my book. Fat's a very, very important thing. If the fat is liquid at room temperature and you heat it, you will oxidize it and make trans fats and it's catastrophic. You don't want to go near any vegetable oil that's been heated. If you're going to heat fat, it should be solid at room temperature. Then that fat is not going to be damaged. It'll be okay to consume.

- Dave: One of the things, in fact, I haven't even shared this with you. It's kind of a secret. By the time we publish this podcast, I think it won't be a secret anymore, is I've been working for a long time to get a stable supply of grass-fed butter so that I can get ghee. We have Bulletproof ghee coming out, which was made from grass-fed animal because it's solid at room temperature for cooking. That's what I use it for, right?
- Terry: Yeah, this will be great.
- Dave: I'm pretty excited. I've been working on this for years, to try and find a supply of it. I don't know if it's a big enough supply, but there's a shortage globally of grass-fed butter thanks to your work. Thanks to things like Bulletproof Coffee. Let's keep the shortage happening so we'll get more cows and more grass-fed farms. Maybe we'll have more grass. It could be good for the environment too.
- Terry: Yes, it'd be very good.
- Dave: We talked about fat being stable at room temperature. What about things like canola oil and soybean oil? What's your take on those if they are, quote, "unheated."
- Terry: I think they're catastrophic compounds. Canola oil is genetically modified. It has a lot of erucic acid, which is toxic. Soybean oil, again, genetically modified. I would avoid that. I would prefer a combination of flax oil, sunflower oil, to get the omega-6, omega-3, and look for products that will help you get three to one, four to one omega-6, three to one omega-3. That ideal ratio.
- Dave: That's an area where I've come across different information in that vegetable omega-3s don't convert very well in the body, like a ratio of 45 to 1, into the really useful omega-3s. Flaxseed oxidizes so fast. Why do you flax instead of just fish and krill?
- Terry: To get the omega-3 for your EPA/DHA certainly is ideal. If you're going to use any kind of oil on your salad dressing, I want that in that three to one ratio.
- Dave: If you're going to use it for salad dressing.

Terry: Yes.

Dave: I typically use an avocado.

Terry: I should clarify that.

Dave: That makes sense.

Terry: [inaudible 31:03] cold oil on your salad dressing, I want that three to one ratio. For your daily use, I'd much rather you eat cold water fish, wild game, grass-fed meat so that you get plenty of that EPA/DHA.

Dave: For my salad dressing, I usually use an avocado. I'll blend it with a Brain Octane oil, which is saturated medium chain fat, right? That way, I'm not doing it. If I want the flavor, I'll splash in olive oil, but I try to keep omega-6s down even from olive oil. That's, of course, extremely fresh, dark glass packed olive oil.

I did, however, in a recent test, depending on . . . there's different labs and all. They're saying I'm low in omega-6 fats, at least in one certain kind, in GLA. The question is, are most labs, because so many people eat so much omega-6 these days . . . are the standards off? Have you come across this?

Terry: No. If we're taking a lot of omega-3 oils, we end up over replacing the omega-3s and not having omega-6. You and I, we're attuned to the dangers of omega-6, so taking the vegetable oils out. If we keep supplementing the omega-3s, we can overshoot and get the ratio omega-3s and 6 swung too far up to the omega-3. That's a potential hazard.

Ideally, you get a fatty acid analysis so you know where your ratio is and realize, oops, I overshot. I'm going to tuck back my supplements so I can get things back in a proper balance. That is, frankly, the hazard any time we're supplementing minerals or fats, is to figure out how to do that without getting the ratios off the optimal range.

Dave: It's tough too because so many of the optimal ranges are like, you're 45? If you're 45, the average for the world is this, so that's about the middle

of the range. You're like, I don't want that average. I want average for an ass-kicking superhero. If only we know what that is, right?

- Terry: That is exactly true. What is the reference range that we should use for, for example, our optimal vitamin D level or optimal vitamin B12 level. Total levels are hard to interpret. It's the ratios that are most useful. Finding somebody with enough nutrition experience to help you know what is that target ratio is difficult. This is an emerging field, Dave, so you're not alone.
- Dave: I am so fascinated by this stuff. I also think there's a big genetic component to this. The more I look at how people's immune response happens based on this presence of this gene or that gene, the complex it is and the more it's really apparent that what you do with your environment is so much more important than the genes you have for most genes. Some genes, you're just screwed if you have it.
- Terry: True. But mostly, it's our environment. The other thing that I think too many people are not aware of. My epigenetic heritage, just how the environment interacts with my genes without changing the DNA, has been passed on to my two kids, Zack and [Zeb 34:27]. But my choices get passed on for four generations.
- Dave: Why do you say four generations? We know the Indians said seven, and I know two we've proven, but four is an unusual number to choose for that. Why four generations?
- Terry: That's what I have read from other geneticists. Part of it has to do with Pottinger's work. When they fed the cats diets that were not so optimal, the cats progressively [churated 34:56]. At the fifth generation, they were sterile. [He did that 34:59] repeatedly. If at the fourth generation, he gave them the optimal nutrient-dense diet, in four generations the cats would have a normal phenotype.
- Dave: Interesting. I remember that as nine, so my memory's just off. I cover that in The Better Baby Book. Okay, it is five. That's cool.

- Terry: The epigeneticists are presuming that. We don't know this obviously for humans, but we're presuming if it took four generations or five generations to create sterility for the cats, and that with four generations, you could recover them back to a normal phenotype, that we think it's likely four generations for humans. We don't know for sure.
- Dave: I hope it's only four. Humans and pigs are so sensitive to toxins compared to rats, mice, cats, and all these other things. Way more sensitive because of the way we process, the way we bioaccumulate. I suspect that we may be more sensitive. This research didn't apply just to girl cats. This means that if you are going to be a father some day, that what you do with your food affects your offspring as much as what the mother ate before pregnancy. Then during pregnancy, obviously. What the mother eats is of vital, vital importance. We're talking big stuff. If you think you're going to get drunk, have pizza, beer, smoke, but you're the dad, it's okay. It doesn't work like that.
- Terry: Our health that we have was dependent on the previous four generations. When people say grandpa smoked, drank alcohol, and he lived to be 80, well, his previous four generations were all working really hard, had great, nutrient-dense diets. To think that we could smoke and have terrible choices, and have that not affect our offspring, is just so wrong, and so naïve, and so unfortunate.
- Dave: This is a probably a rough question, but are you concerned about a global population problem?
- Terry: It's out of my area of expertise. I think that having 9 billion people on this planet is probably not going to be a good thing. But my observation is the chronic health is declining. The chronic health is worsening. When I look at our kids, one in three being obese, or one in two if you're African American or Hispanic. I don't know what the world population is going to be, but I see fertility rates falling. I see chronic disease cropping up. I think our ability to fight infections are declining. I don't know what will happen to the population, but I don't see continued growth [inaudible 37:39] going on infinitely because we're wrecking the environment. We're wrecking ourselves. Fortunately, I do see segments

within the population understanding diet and lifestyle, and returning to more health-promoting ways.

- Dave: It seems like given this four generation problem, it seems to me like we have a population problem now, but we'll less of one going forward because it is vanishingly difficult to conceive. One in eight couples, they can't conceive without artificial help and it's getting worse.
- Terry: Exactly. This is happening . . .
- Dave: Go ahead. Sorry.
- Terry: . . . [inaudible 38:17]. Sperm rates are dropping globally internationally. Yes, I completely agree.
- Dave: It's amazing. Lana's small sample size . . . my wife, Dr. Lana. Because of The Better Baby Book, she does fertility coaching. She's got clients in the Middle East, in China, in the UK, and India. They do it over Skype. It's interesting. It's not just in the US. It's not just in North America. It's even in so-called younger countries or countries that haven't had the westernization for more than a couple of generations. It seems like it's global. I look at my kids and I've done everything possible since before they were born to try and reverse this trend. They eat the cleanest stuff I can find and afford. I devote more time and energy to it than I'd like. I just hope that when they turn 18, they're not out eating pizza and god knows whatever else and undoing it because I know when I was 18, that's probably what I would've done. I'm really hoping to pass the values on right.
- Terry: I'll tell you, my teenage kids did fall away from the good nutrition. Fortunately for me, my daughter gets migraines, so she pretty quickly, okay, these migraines are miserable. She's back eating a really good diet. My son is also coming back to eating really clean. Your kids will probably do that, but hopefully it'll be for a very brief time and they'll come back.

Dave: I was just about to ask, because my next question was, what happened with your kids? You've been down that path already and you give me great hope there.

Let's talk about intelligence for a little while. I am putting together a really comprehensive brain program. I would love to know what you recommend for increasing IQ.

Terry: Physical exercise is probably one of the most important because physical exercise stimulates nerve growth factors. You'll also want to do learning, particularly if you can learn a new language, that's very, very powerful. Take care of stress, heart [mass 40:22] and other programs to help you decrease your sympathetic tone, your parasympathetic tone a little bit, that would be very helpful. Maximize your mitochondria and fat. You need lots of good, healthy fat for your brain. Very nutrient-dense diet. That would be my approach.

Dave: Sounds like a wonderful approach to me, very similar to the one that I do. What about when you talk about toxins? What about glutathione, which is one of those big things in the liver. What do you do about that? What's its role with mitochondria?

Terry: Glutathione [inaudible 41:00] synthetase is stimulated by brassica vegetables, vegetables in the cabbage family and in the onion family. It's another great reason to include those in your diet. Lipoic acid can be helpful. Unfortunately, taking glutathione by mouth does not work very well unless you have liposomal or some programs use IV glutathione, which can be helpful.

Dave: I've done IV glutathione a few times. It definitely worked.

Terry: [You 41:33] like that?

Dave: Yeah. I do the liposomal plus some other molecules for better absorption. That's one of the products that I make. Do you use glutathione on a . . .

Terry: As a matter of fact, I use your product every morning.

Dave: You are using it?

Terry: Yeah.

Dave: That's amazing. I knew that you tried some, but I didn't know if you still use it.

Terry: I still use it. I discovered if I missed a few days, I can appreciate the difference. It keeps me very consistently with it. I find it to be quite helpful.

Dave: Thank you. That's amazing.

Terry: I didn't mean to give you that infomercial, but you got it anyway.

Dave: I know I shipped you some awhile back, but I haven't asked you about the feedback from it.

Raw meat. I was a raw omnivore for awhile when I was recovering from being a raw vegan. Most people freak out about eating raw meat. What's your take on raw meat?

Terry: If you look at the arctic Inuit, [inaudible 42:30] 10 months out of the year, they're consuming meat. It's mostly fermented. Traditionally, it would've been fermented and raw. They had terrific health and vitality. I believe the Maasai in Africa have a lot of raw meat, raw milk, and blood mixed in with the milk that's part of their culture and traditions. Certainly we have traditions that thrive on that.

In our environment, we have some challenges doing the raw meat in terms of finding safe sources from a public health perspective. I talk about raw meat in those societies in my book with the big caution that because of the challenges of how you find that product. I can't make that recommendation, but we absolutely have societies that have thrived on raw meat.

Dave: Yeah, it's risky. What about parasites? Do you cover those? Did you look at those in yourself? Is that a role? Do they play a role in MS?

- Terry: Actually, it's very interesting. There's a study using whipworm. People ingest the whipworm. It had decreased numbers of lesions and improved functional activity.
- Dave: For MS? Not just for [inaudible 43:50]?
- Terry: For MS.
- Dave: I took the [pig 43:52] whipworms.
- Terry: Isn't that interesting?
- Dave: Yeah, I did it.
- Terry: That study is done in Madison. They're continuing to work on that, I believe. There's application to do, another level of trials, and patent applications, etc.
- Dave: Did you do it?
- Terry: Did I do it? No.
- Dave: I can tell you that if you scramble the whipworm eggs, they're delicious.
- Terry: I'll keep that in mind.
- Dave: I drank a little vial of them and it was scary. This was maybe six years ago or so. I tried it. I ordered some from Thailand. I never felt any difference. I have no idea if they did anything, but it was spooky.
- Terry: Around the globe, 80% of humans have parasites of some type. There's a big hygiene hypothesis that as the infections go down, you use vaccinations, you have fewer viral infections. Antibiotics [inaudible 44:44] fewer bacterial infections and the parasites are removed. That they're also in that same sequence [inaudible 44:41] timewise, dramatic uptake in the autoimmune problems.
- One of the theories that's gaining more and more traction is that those infections help regulate and mature our immune cells so they are not

attacking [cells 45:07], and that perhaps these parasites have more of a symbiotic relationship than we appreciate. Those answers aren't fully in, so we don't know. But I think we're having a huge experiment with the long term consequence of vaccinations, which mean our children aren't getting these viral infections. The antibiotics mean they aren't getting the bacterial infections.

What is the long term consequence in 30, 40, 50 years? It's not quite so clear what the health risks are. It could be that we're saving a few lives by using vaccines and antibiotics. No, and I don't argue that. But we may be increasing the burden of chronic disease as a result. Then you have a public health policy, loss of a few lives versus the chronic poor outcome, loss of quality of life, and health care expenditures, productivity, etc.

These will be debates that we'll look back at 100, 200 years. They'll have a very interesting perspective on the wisdom of those vaccines. [inaudible 46:24], we may decide that it was not such a good thing. Who knows?

Dave: It's really a tough thing as a parent of young kids. My wife, a trained physician from Sweden, they have an entirely different protocol and timing for how often and what vaccines you give to a child versus in the US, where you just pump it all in pretty quickly as soon as they're born. Those differences seem to have a huge effect and it's just not that well studied on either side. It's concerning for sure.

Terry: Another area that's not well studied. You have the killed virus attenuated so it's not going to cause infection. Then you add an [adumin 47:09] so you get more of an immune response. We don't have a lot of studies to guide us how many doses of [adumin 47:16] can you give at one time in one day safely and what are the health consequences of all those [adumins 47:23]. I think there are a number of unknowns.

The other question I would ask is, how many of these vaccines are lifesaving? I don't really know. I'll freely admit that the vaccine question's outside of my area of expertise. But as the hygiene hypothesis is gaining more and more ground as one of the contributing factors for autoimmunity, it gives me a great deal of pause.

- Dave: My kids play outside in the dirt two hours a day and sometimes they wash their hands, so let's hope.
- Terry: Don't let them wash them too often. [inaudible 47:59]
- Dave: Exactly. Let's hope it's the right thing, and let's hope it was the right dirt, right? Who knows. I have a couple more questions for you if you have time.
- Terry: Please.
- Dave: Two other things for mitochondrial function, because everyone benefits from better mitochondria. There isn't a downside to having highly functioning mitochondria. Number one, electrical stimulation. How does that improve mitochondrial function? You're one of the few people who talks about using it besides me.
- Terry: The electrical stimulation, for the other listeners who may not know about it, is done through the skin. We use cutaneous pads that get applied to the muscle. You find the motor point, which is over the nerve going to the muscle. You have a batter-operated device, usually hand held. You turn up the current, and the current flows through, causes the muscle contraction. You do a [valicial 48:50] contraction at the same time.
- By working the muscle more vigorously, the muscle will end up adding more mitochondria per cell. The mitochondria will be more efficient. There'll be less oxidative stress. You'll also have more nerve growth, more [insulite 49:09] growth factor and nerve growth factor locally at the muscle to help you get larger, healthier, more vigorous muscle cells.
- Dave: Is that going to increase your IQ too because you're giving that effect of exercise?
- Terry: It might. We don't have any lab studies to confirm that, so that would simply be speculation, but the potential mechanism is there, yes.

Dave: What an amazing answer. I feel like there might be something there, but I have no idea. I was hoping you would say there's 15 studies, but all right. Maybe.

Terry: Maybe.

Dave: The other question is around our good friend MCT oil. What is its role in mitochondrial function.

Terry: The mitochondria can utilize sugar, amino acids, and fats to generate energy in the Krebs cycle. The MCT oil in the liver will be converted to ketone bodies, such as hydroxybutyrate, which can pass the blood-brain barrier, go up to the brain, and end of the Krebs cycle, and generate energy very, very effectively and efficiently. The ketone bodies are great stimulators of nerve growth factor. They are fabulous [fibrous 50:21] fuel for the brain.

The other beauty of MCT oil, it cannot get converted into fat as in your fat cells. It's only going to be burned as fuel in your mitochondria. It's perfect stuff.

Dave: That is one of the many reasons that it's there in Bulletproof Coffee. Man, I feel the difference versus no MCT oil, so it's something that I travel around the world with in a little bottle. You saw me pour it on my asparagus I think last time we had lunch together just because it matters.

Terry: Another beauty of MCT oil. I like to be in ketosis. I feel better, more energetic in ketosis. By using MCT oil to maintain that ketosis, it lets me get more carbs in my day, which lets me have a nutrient-dense diet that has all the vitamins, minerals, and antioxidants. If you do ketosis without MCT oil, you have to reduce your carbs to about 20 grams. At that level, you're going to develop vitamin C deficiency, vitamin K deficiency. You can probably maintain your vitamin A with liver. You won't have enough of the phytonutrients and you eventually are going to start running into chronic disease because of nutrient deficiency. With MCT oil, we have a buffer. We can get the best of both worlds.

- Dave: That's is an elegant way of expressing it. What about just eating coconut oil?
- Terry: Coconut oil, I love to cook with it. That's another fine option. The MCT oil is a little easier for some folks. They don't care for the taste of coconut oil. It's just another very nice option.
- Dave: Got it. There's a difference in the percentage of MCT in coconut oil, that lauric acid versus the shorter chain.
- Terry: Yes.
- Dave: Awesome. We are down to our final question, one you've answered before, but one that I'll ask you again because usually people come up with different answers. What are your top three recommendations for people who just want to perform better at whatever it is they do? It doesn't have to come from MS or anything medical or not. Just your top three most important things. What matters?
- Terry: You want to take out the foods that are at highest risk for food sensitivities. From my perspective, that's gluten, dairy, and eggs. That's step number one. Step number two, I want you to get more vegetables in. I do the green sulfur color. Step three is you have to have good, high quality protein. Those are the first guidelines I lay out.
- Dave: I recommend that everyone check out your book. You have an amazing background and amazing story. The book is well-written. If you haven't seen Terry's TED talk, you should see it. It's quite amazing. We'll put links to your book. We'll put links to the TED talk. Tell everyone the title of your book, give everyone your URL, and just how they can find you.
- Terry: The Wahls Protocol: How I Beat Progressive MS Using Paleo Principles and Functional Medicine. My website is terrywahls.com, that's T-E-R-R-Y-W-A-H-L-S dot com. I invite all the listeners to go to the website, download the free materials that we mentioned in the book. There's a terrific recipe guide and some information on toxins. Follow me on Twitter @terrywahls. Follow me on Facebook, Terry Wahls MD.



Dave: Terry, thanks for being on the show. Again, I'm always pleased to get a chance to support your work and to let people know that you've got a new book out. What you're doing is important and I really, really appreciate it. Thanks for being on the show.

Terry: Thank you.

Dave: If you're looking for a way to know which foods are making you weak, check out the free app that we just released called Bulletproof Food Sense. It works by using the phone camera in order to get a measurement of your heart rate, or you can just type in your heart rate if you know what it is from some other monitoring device. You do this before a meal and you do it after a meal a couple times. Based on changes in your heart rate, the application can help you to identify which foods are causing an immune response in your body. Based on that, you can choose to avoid those foods and you'll find a huge boost in your performance just from not eating the foods that you have sensitivities to. You'll also find that you can lose weight much more easily when you're not eating foods that cause you to feel foggy and inflamed all the time. This app is free. It's called Bulletproof Food Sense. It's available on the iPhone Store.

You can also take a step further. Check out Bulletproof HRV Sense. That stands for Heart Rate Variability Sense. Bulletproof HRV Sense goes a step beyond Food Sense and it works with a wireless heart rate monitor that goes around your chest. You wear the heart rate monitor and it'll talk to your iPhone or your tablet. It'll show you your stress levels throughout the day. It'll help you know whether you're overtrained, overstressed, or even just help you know which meetings are causing the most stress in nervous system so you can learn to take control of that stress. This is an awesome app.

Number one, Bulletproof Food Sense is free. Number two, Bulletproof HRV Sense is a few dollars and it makes a huge difference in how you manage and control your stress.



Featured

[The Wahl's Protocol: How I Beat Progressive MS Using Paleo Principles and Functional Medicine](#)

[TerryWahls.com](#)

[@terrywahls](#)

[Dr. Terry Wahls on Facebook](#)

Resources

[Minding My Mitochondria](#)

[Dr. Wahls' Recipes](#)

[Dr. Terry Wahls' TEDx Talk](#)

Bulletproof

[#70 Defeat Disease Using Diet with Dr. Terry Wahls – Podcast](#)

[#27 Minding My Mitochondria with Dr. Terry Wahls – Podcast](#)

[Upgraded™ Brain Octane Oil](#)

[Better Baby Book](#)

[Upgraded™ Glutathione Force](#)

[HeartMath Inner Balance](#)