



**Transcript of “Dr. Tim Jackson: Heavy Metal Toxicity,
MTHFR, & Genetic Testing – #199”**

Bulletproof Radio podcast #199



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Dave: Hey everyone, it's Dave Asprey with Bulletproof Radio. I'm opening up today's episode with a shot of espresso from the world's coolest looking espresso cup ever. Check that thing out, handmade, Rams Head espresso cup. If you're in your car, you missed the coolest shot of espresso ever. That's alright. We've taken steps to upgrade your audio quality, so you should be hearing it even more crystal clear than before. It's actually a huge upgrade, so if you like the new audio, let me know. Just head on over to iTunes, put over comments, say you love the new audio, head to Facebook, just let me know that it worked or if it didn't work and you're having a problem. I really care about this. I realized Bulletproof Radio has had more than 11 million downloads that's like 50 lifetimes worth of time, so I would hate to think I spent 50 lifetimes making bad quality audio, so seriously I want to get it right.

Today's cool fact of the day is not about audio. It's actually about the Belgian Blue, which is a breed of cow with a genetic power of selective breeding. They managed to breed in a single genetic defect, which is a faulty myostatin gene and that makes these cows just hugely bulky and muscular. In fact they're called double muscling phenotype and that trait allow the Belgian Blue to have an increased ability to convert feed into muscle, which causes their meat to have less fat, which is kind of bummer, at least if you're feeding them good stuff. You may also notice, wait a minute, something genetic, not just calories in and calories out, affected muscle mass growth, oh my goodness maybe calories in, calories out doesn't explain everything.

You just might think from thinking about something like this, but hey, who is counting calories anyway. Today's guest is Dr. Tim Jackson. He's an expert in nutritional biochemistry, digestive health and the system of the human body as well as something called functional endocrinology, which is a fascinating field in and of itself. Looking at how do you manage the endocrine system, not like an endocrinologist who is going to fix something, but how do you work on the system of your hormone

system and that's way cool. The reason I invited Tim on today is that he's a feature doctor for the MTHR support group, which is a group of health care guys working to look at methylation of DNA, genetic differences in people and how those affect things.

If you listened to one of the 200 or so episodes here, I've talked multiple times about how I have an inability to process folic acid, the chemical form that is in our food, thanks to some government regulation, even though approximately a third of us build up toxic levels of it because we should be using the methylated form called folate. Tim is here on the show today to talk about that and a whole bunch of other stuff that has to do with making your hormonal system and the whole system of the body and your digestion all work together. This is a guy who just does all sorts of things that run from the traditional like western sort of thing all the way to traditional, more eastern sort of things looking at physical therapy, looking at movement, so a well-rounded guy and that's why I wanted to have him on. Tim, welcome to the show.

Tim: Thank you Dave, I appreciate it. Thanks for having me on.

Dave: It's hard to know what to ask you first because I mean you actually have a doctorate in physical therapy and you do active release technique, which is about like trigger points in the body. These are pretty different from functional endocrinology and genetic differences and methylation, so renaissance bio-hacker, is that a good introduction?

Tim: Well, what I realized is that after going to undergrad, I had the plan to get my MD and I got bitten by the nutrition and exercise bug as an undergrad. I knew I wouldn't get much of that information in traditional medical school. I like doing things hands on, so I decided to pursue a doctorate in physical therapy and all the while kind of studying on the side on my own different functional medicine courses and reading different books and research articles from PubMed. What I came to realize is that I could fix a lot of external problems by balancing the system internally because a lot trigger points, a lot of musculoskeletal imbalances or pain syndromes, joint problems or just manifestations, hormonal imbalances, common example would be frozen shoulder, where you typically have to go to physical therapy for about three

months. That's classically associated with hypothyroidism.

I found that by balancing vitamins, minerals, hormones that I really didn't have to put my hands on people anymore and I was getting people better quicker. I typically don't do any of the traditional physical therapy stuff anymore. I've kind of stuck with the functional medicine and branched just into consulting on that. Like you said, with the functional endocrinology now and the epigenetics, it all ties in, but it's very different than your traditional western approach because traditional endocrinology unfortunately has become a distribution center for diabetes drugs. When someone asks me for a referral for hormonal problem, I typically tell them, "Avoid endocrinologist, look for functional medicine doctor."

Dave: That's a big statement, avoid endocrinologists. I remember years ago when I was first realizing that something wasn't working with me that I thought I'll see an endocrinologist, but it just wasn't right. It's kind of like you're not on your back, so there's nothing wrong with your adrenals and I was sort of looking for these extreme things. Like, I know something isn't right, but maybe it's not quite to the point of being flat on my back and twitching. But I felt like that wasn't the right path for hacking myself. That's for sure and you had the same experience. Talk to me about those 26 titanium screws you've got. What happened with your jaw and how did that influence your perspective on these things?

Tim: Yeah, well actually, how did you find out about that? Did I write that somewhere or I may have said it in another spot?

Dave: We have a broad network of Bulletproof mafia, no. I do my research. It's actually a lot of work to interview someone before you actually get them on, so yeah.

Tim: Yeah, no, absolutely.

Dave: I really appreciate that and don't want to, but it's really interesting.

Tim: No, what happened was I started seeing an orthodontist for braces when I was an undergrad student. The orthodontist referred me to an

oral surgeon and said that I was maxillary deficient. Basically, I had an under bite or an overbite. He went in, the oral surgeon, they basically put the fear of God in you, telling you you're going to lose your teeth if you don't have the surgery things like that. I was actually under anesthesia for eight hours, which all the oral surgeons I've talked to afterwards said the surgery should never gone past three and a half hours. This guy, he put in 26 titanium screws and several plates and that was obviously a huge stressor to my body, a huge drama. Coming out of it, I probably had Lyme disease all along and my immune system was able to keep it at bay after experiencing that stressor, it came from being subclinical to clinical.

I started developing symptoms, but living in the Southeast, of course most MDs say, "Lyme doesn't exist here, yada yada," but obviously we know that ticks can't read road signs. I went from being subclinical to clinical with my Lyme symptoms. I was really being treated all along, even by other integrative doctors for things like Candida, heavy metal toxicity. Those all helped, but it wasn't until I started really going after the Lyme disease and mold toxicity, which I know you're very very familiar with that I started making any headway. It was very frustrating, trying to explain to people like I have the dreaded genotype. My immune system doesn't bind to mycotoxins, so they built up in the body, interfering with other endocrine glands and hormones, disrupting alpha MSH, causing leaky gut, contributing to inflammation.

Going after those things helped me a lot. I'd say, I'm not completely recovered, but I made headway with treatment with the Lyme. But, I probably went 20 years or so undiagnosed.

Dave: It's really interesting that we started talking about the jaw and ended up with Lyme. [Dr. Dwight Jennings was just on Bulletproof Radio](#). He is friend who has realigned my jaw covers, so I had essentially, would have been an under bite. Same sort of thing like when dentists say, "You should basically take out most of all your teeth and replace them with bridges and all," for even a different reason, but I fortunately went to a saner kind of physician. Both Dr. Jennings and Dr. Gallagher, who has since passed away, Dr. Gallagher was one of the preeminent ozone dentists out there. Both of them had radically different ways of

approaching the neuromuscular problems with dentistry because as you all know, if someone has their hands in your mouth for eight hours, holding your jaw open, your trigeminal tied directly to your fight or flight response gets triggered and often times it doesn't get untriggered. When that gets triggered, bam, opportunistic things like Lyme and other things, just they climb up. Yeah, I had active Lyme. I have mold toxicity, which I think was a trigger for the active Lyme. It's entirely possible to recover from every one of those things, but it isn't as easy with metal in your body, right?

Tim: Right, so, yeah and it was hard for me to find a surgeon who was even willing to remove the screws and some of them, he couldn't to. There was too much bone development around them. They had been in for too long, but I think he removed 18 or 19 of the screws and I think two of the titanium plates. I'm sure you're well aware of cavitations in the jaw and how they can release bacteria into the body. That can be an aggravating factor in both Lyme and mold.

Dave: Explain that for people who are listening in their cars, just what is the cavitation, how does all that stuff work because if you experienced that that's actually a big problem for people they don't know about.

Tim: Yeah, so cavitations, another word for it is osteonecrosis or basically death of the bone. It's pockets of infection in the jaw and depending on the person and the infection, there will be different types of bacteria. There is a lab you can send it, if the bone is removed, you can send it off to and they'll detect and tell you which species were discovered. It becomes a problem because if you are constantly releasing these bacterial toxins into the bloodstream, you know that wearing down the immune system. Dietrich Klinghardt talks a lot about cavitations and how they are connected and that there is actually a natural path and a dentist in the UK who believes that Lyme begins in the mouth. She has done a lot of imaging, finding spirochetes and the saliva of people.

The cavitations can be an issue because traditional dentists don't pick up on it because regular x-rays don't pick up on it. EAV testing, which is basically testing electrical current that can pick up on it as well as a machine called a CAVITAT, which there is only a handful of in the

country. Those are the most sensitive ways to detect if you are actually are dealing with the cavitation at all.

Dave: It's interesting what these things can do and I'm so impressed that you managed to pull the metal out of your mouth. I've had this in my knee since I was 23, so it's almost 20 years. I recognize that it's not a good thing to have in there, particularly because my wife and I ran a company that could diagnose an immune response to metal in the body. I have an immune response to titanium, which is what the screw is made out of, but I've never been able to find a doctor who is willing to remove it.

Tim: So the MELISA test?

Dave: Yeah, we used to run MELISA USA. That's exactly the test. In fact, I met Dietrich Klinghardt that way, shared a hotel room with him at the American Academy of Anti-aging Medicine once, just an amazing guy who just knows stuff. There's this whole community of people who are paying attention to genes and metal and electrical currents in the body. You guys are frankly kind of at the very cutting edge of medicine. You put on your futuristic hat and you go forward 20 years and the stuff that you are talking about will be mainstream. Right now, it's rough going. The fact that you actually went to the point of going through the pain and trauma of removing screws from your mouth because you did the research and decided, "Okay, this is enough of a medical problem," because this is creating a battery effect and small amounts of current over the palate of your mouth, which is one of the densest areas full of acupressure points might just be valid for you. You did the work and I respect the heck out of that.

Tim: It was painful, trust me.

Dave: I bet, it hurt. Is there something from that experience that translates to people who maybe have a root canal or people who have something that isn't quite right, like how do you go from the extremes, where you've been from health perspective or I've been in is recovered from, how do you derive value from that when you are someone who is like, "Yeah, I feel pretty good, I'm little tired, I work really hard, by the end of the day,

it's normal to be a little bit low," stuff like that. Is it a spectrum? How do you approach someone who isn't as sick as you or I were?

Tim: Yeah, what a tell people is that all disorders really exist on three levels. The first level being an energetic level that's where you know bio-electric or dermal scanning would come into play and so if I asked someone with an energetic imbalance if they felt bad, normally they would say, "No." The next level would be a functional disorders like chronic fatigue syndrome, where there is no specified markers for, but it's a very very real thing. Then the last level is the lesional disorder, where it picks up or an x-ray or MRI or blood test can pick up on some abnormalities. It depends on where you are on that spectrum as to whether or not you are expressing symptoms and typically people associate their problems with the last stressor that they had that caused the symptoms.

They probably have these accumulating stressors over their lifetime, what we call the allostatic load, the total stress load in the body. Then, they finally have maybe a car accident or a surgery or a mold exposure and that kind of threw them down this proverbial vertex and in order to bring them back, requires IV nutritional therapy, supplementation, diet changes, sleep, hygiene, circadian rhythms. All those sorts of things. Like you are saying earlier with an endocrinologist, they recognize the extremes. They recognize Addison's disease and Cushing's, but they don't believe that any things exist between it. The truth of the matter is let's take diabetes for example. You don't go from perfect insulin sensitivity to being diabetic overnight. There is a spectrum. I think everyone kind of falls along that spectrum at different points, but I think it's important to get some form of lab testing done every six months, definitely every year because unless you test, you really don't know. A lot of times, you may find out that something is wrong and it's too late.

Dave: Yeah, waiting until things are broken and you really can't take another step is really a bad idea. I'm running the Silicon Valley Health INSTITUTE, which is 20-year-old anti-aging education group, it has been illuminating for me because most of the members there are 60+. You look at how hard they're working, how much money they're spending to reverse mistakes they made when they were young. One of the things

that inspired me to do the whole Bulletproof website was that basically I was old, when I young, I had arthritis in my knees when I was 14. I dealt with all the stuff up to and including my mid-20s. I used a lot of these techniques that older people were using to stay younger to fix myself. I just realized, “Man, if someone had just taught me this to have that preventative side, things would have been really a lot easier for me.” That was the motivation to start writing the stuff that I write and what your finding is a similar thing it sounds like.

Tim: Yeah, people, a lot of times, come to me, they want to do some functional lab testing. I have to help them privatize testing if they can only afford so much. I tell them, “There is no need to test for magnesium deficiency, you are deficient in magnesium, there is no need to test for leaky gut, you have leaky gut, it’s a waste of money.” Same thing for heavy metals. It’s not a matter of, if you have heavy metals, but how much. We’ll get into this more later, but if your detox pathway is phase I, phase II, phase III, if they’re imbalanced and you do a provocation tests, sometimes, it just redistributes metals to other areas of the body and can cause an exacerbation of symptoms.

Dave: Let’s talk about that in a bit motivated because I think some people who are listening or don’t quite understand like which metals we’re talking about or what the challenge test looks like or provocation test looks like. Will you just unpack that a bit for people, so what metals are we talking about and then what would you do to if you have them, which as you say, most people do and I would decorate, what would you do about it, what would you see from them?

Tim: With metals, we have heavy metals and toxic metals. Some metals like aluminum are toxic, but they’re not technically considered heavy. In general, we are referring to things like mercury, titanium, arsenic, aluminum, those are probably the most common heavy metals. I think I read a statistic that 6 million pounds of mercury is released every year into the environment. We are all certainly exposed. As far as what the heavy metals do or the toxic metals do, they can disrupt mitochondrial function, which the mitochondria are the batteries of your cells. They are what drive all your tissue functions, so if they are not working, it affects every organ system in the body. Aluminum in particular is very

damaging to the mitochondria. They also suppress the immune system, mercury does and can interfere with thyroid and adrenal function as well as brain fog and interfering with insulin sensitivity.

We have these metals, typically our bodies have enough wisdom to try and store them away in our fatter adipose tissue. When you do a provocation tests, which is where you take out what's called a chelation agent, something like DMSA or DMPS, you take that and you collect your urine a few hours later. That's basically pulling the metals out of the tissue, so we can gauge your total body burden of heavy metal toxicity because if we just measured your urine without the provocation agent, most of the time, you're not going to be expelling metals. The other ways are to check hair. Hair, I found is good for ratios of nutrients, but the studies I have come across, especially in kids with autism, even though their total body burden of mercury is very high, their hair level of mercury is very low.

With these metals, there are various ways to get them out that actually kind of ties a little bit into methylation, but glutathione is a potent chelation agent and a natural way to get metals out, get them to the liver. Alpha lipophilic acid, DMSA, DMPS, those are kind of harsh for some people, especially if they have high levels of metals. You really want to start by not isolating the metals, but looking at the total body function. In a healthy body, most of the time metals come out through the stool, but when you have malabsorption or maldigestion, it shifts the stress to the kidneys and that's why you see so many people with altered BUM to creatinine ratios. Metals can come out via the urine or via the stool. Actually, certain types of bacteria in the gut can change the form of mercury. If you have mercury amalgams, I think that's ethyl mercury and then the bacteria in the gut change it to methyl mercury.

Chris Shade from Quicksilver Scientific does a mercury speciation tests, where he measures the different types of mercury, which I think can be helpful, but for most people, I generally start even if I know they have heavy metals, working on gut health because that takes some of the stress off the liver and then providing liver support and some sort of drainage remedies can be very helpful for people to just normally

support the typical physiologic actions versus more potent chelation agents.

Dave: If you're listening to this and you've just heard Tim who is talking about saying pretty much if you are alive, you have heavy metals. It's mostly because we have been burning insane amounts of high mercury coal that reduces the stuff into our food chain and it accumulates in plants and you get it. You might say, "Well, I'm not really affected by this because like I'm here." The problem is it's like imagine that you're a Superman and somebody pulverized kryptonite and just made a powder of it and just sprinkled it around. It gets into your body when you eat something and it's in there. You're just a little weaker than you were before and you can push through. You can hold yourself back and really you can make it happen, except well at a certain point it gets to a level where it like all of your energy is going into it.

What I found for me, I had high mercury too and I did go through chelation with over DMSA and intravenous DMPS and some EDTA intravenously as well. If you don't know what those are that's okay. Those are basically agents that are used to stick to these metals to make you pee them out or poop them out as the case may be. You can add fiber and you can add cilantro and there's various other things like that. Here is the deal, even if you're a high performer, if you've never measured your metals or you don't preventative lead do things like eat chlorella with your sushi like I recommend in order to help you escort these things out of your body. Over time, they are going to build up and you won't feel it. It's a slow decline in performance. The whole point here is that if you can find this and even if you don't find it, you just take simple steps to lower your body burden of these things, they slow you down. It's not a binary, I am either sick or I'm not sick, you just lessened.

I don't want that for you or for me or for anyone else. That's why Tim, I think I asked you on the show, like talk about that. What would someone feel long before they get sick, like before they get you and I ended up where we're like pretty darned sick. Let's say your mercury levels were just creeping up, what are the first symptoms to look for?

- Tim:** It can manifest differently, depending on what other metals are in there along with it. Depending upon if they have aluminum, arsenic, etc., but you can notice decreased thyroid function, which if you are not that familiar with the thyroid, your body temperature may slowly start to be over. Your energy level with slowly start to decline. Your concentration and memory may slowly start to deteriorate. Now, a lot of people say, “Oh, it's just age, it's just age.” But, it's not just age when you have these things gradually creeping up, you may also notice increased infections. Mercury and other heavy metals kind of live in these biofilm communities, biofilm is just shield basically made by the microbes to hide from the immune system. They kind of hang out in there with the pathogens and so mercury can definitely cause or exacerbate candida infection, lead to reactivation of certain viruses like Epstein-Barr, HHV6, those things. From there, it just typically gets first. If you are not having regular bowel movements and you're not staying hydrated with electrolytes and things like that, then you're definitely being exposed and you're getting this cumulative effect of biotoxins basically overtime.
- Dave:** To make that into an actionable piece of advice for someone sitting in the car now or someone watching this at home on video. Okay, so now I'm concerned. Maybe I have some mystery or some other metals, I probably do, I have been flying. I live in a big city or all the other things like that. What should I do first?
- Tim:** Well first of all, I would say work on your gut health. Make sure you're moving your bowels because you never want to mobilize things that you can't excrete. The kidneys, if they are stressed enough overtime what can happen is they kind of scar down. You get kind of a mild form of glomerulonephritis type stuff. Working on digestive health, people say, “What does that have to do with detoxing mercury?” Well, it takes some stress off the liver phase I, phase II pathways, which will need to detox heavy metals. Actionable steps to optimize gut health, you can do a stool test to make sure you don't have any pathogenic bacteria or yeast or parasites, optimizing any deficiencies in the probiotics or a good bacteria, but also making sure your digestive chemistry and your digestive sequencing is working. What I mean by that is you have sufficient stomach acid, which triggers sufficient production of bile or release of bile, which then triggers the release of pancreatic exocrine

enzymes. A lot of people think, pancreas, insulin, but the pancreas also produces digestive enzymes.

By optimizing your digestion, it's one less stressor to the liver and then you can, something simple like glutathione. Everyone needs glutathione I think. Statistics I've read showed that the lower your levels of glutathione, the higher your risk of every disease out there. Increasing your red blood cell glutathione levels will also help to excrete metals.

Dave: It's kind of funny I know if I sent you some, I didn't plan that I had of time, but I make glutathione with special absorption technology and specifically to raise my own glutathione levels because I know how important it is to maintain healthy levels of metals in the body. I kind of make that stuff that I want to use. I also get intravenous glutathione. Whenever I am at a naturopath who offers intravenous stuff, I get IV glutathione along with Myers' cocktail and mix of mentholated B vitamins and other things because it works. You can feel the difference with that stuff. It's pretty noticeable. Do you do Myers' cocktails or do you recommend them?

Tim: I think I've gotten only one or two Myers' cocktails in my life, but I've gotten IV ozone, hydrogen peroxide, vitamin C, poly-MVA, IV chelation. You name it, I've gotten it in IV form. Glutathione, it's important that you brought that up because some people drip it and it has a completely different affect if you push it versus dripping it. When you push it, it overwhelms the oxidative system. You know the max dose from the research I've done is you can go up as high as 10 grams. If you are toxic with metals, you probably don't want to in a push.

Dave: You said, if you are toxic metals, what?

Tim: Yeah, if you are toxic with metals, I'd start with a very low dose, like a few hundred milligrams to 1 gram because it will give you energy, but you are also going to mobilize toxins. You want to make sure you are able to excrete those and that you don't have a flare-up of any of your symptoms or make yourself worse.

Dave: Yeah, it's a complex system in there and anything, at least I found in my own experience and my research, anything you can do to make you liver or your digestive system better at getting rid of the crap that gets in us, like the stuff that even forms doing metabolic processes, it makes you feel better. There are also anti-aging effects and more resistant, more resilient, but to sort of say, "Well, I'm fine, so I'm going to ignore the effect of anti-nutrients and toxins in the world," it doesn't lead to a high-performing life. I just don't know another way to say it.

Tim: Right.

Dave: Let's switch gears and let's talk about this gene that maybe 50% of the population have. We're talking about be methylenetetrahydrofolate reductase gene, which you probably have heard me mention before as MTHFR. What is this gene and why should anyone listening care about it?

Tim: Yeah, so it's technically, a lot of times we say mutation because people can identify with it. Technically, it's what's called a SNP or single nucleotide polymorphism and all that means is that our DNA is made up four letters A, T, C and G. Typically, A binds to T and C binds to G. These are your nucleotide bases that make up the double helix. If the body puts down the wrong letter in the wrong place, you end up with a single nucleotide polymorphism. There's a different letter and a different base pair at that position. All of our genes code for enzymes so if that gene coding or transcription is interfered with, it interferes with the enzyme function. If you have one copy of MTHFR, which is referred to as being heterozygous that can slow the function down by 30 – 40%. If you have two copies, it's usually more around 60 – 70%.

The reason this polymorphism is so important is because it really has a footprint in many different areas of the body. If we can just briefly go over those, so neurotransmitters, especially serotonin and dopamine are created through methylation. Glutathione, our favorite molecules made through methylation. Myelin, the coating around our nerves is made through methylation and also certain growth factor that deliver nutrients to cells, amino acids, things like that. It also plays a role in controlling viral replication, so viruses are typically suppressed. They

incorporate their DNA into our DNA, but if we're methylating well then that means that those viruses are suppressed.

Methylation, it's not just one reaction, it's over 100 reactions and it happens over a billion times a second in every cell in the body. Anytime we see something happening that much, it's a clue that it's credibly important.

Dave: If people are interested in knowing what their methylation genetics look, I've recommended and one of the way I did this, I've gone through Amy Yasco, I've gone through her work. She is one of the first people to really talk about this and autism, which is relatively expensive analysis, but it comes with a lot of analysis on top of the data. But with 23andMe data with various free services, you can actually get this done. As we're sitting here talking, I just pulled mine up from Genetic Genie and looks like it'll probably come up in a second here. I know that I have a bunch of my genes that don't work that particularly well in the methylation side of things. Is that a safe way to do it, like would you recommend that that's the cheapest way for the average layperson, maybe who isn't suffering from chronic illness, but just want to know, "Hey, should I take supplements with folic acid." Like, if you have the genes that say you shouldn't, then you shouldn't take them and there is no excuse for any supplement manufacturer putting folic acid in supplement. If it's in there, it means they didn't do their homework.

Tim: I agree and yeah I think the 23andMe test for the cost \$99, it test thousands and thousands of polymorphisms, so it's very much worth the money. A lot of people are confused because they heard about the FDA slapping them on the wrist, but you can still get what's referred to as your raw data, which is R, S and then a long ID number. Then you can use one of the programs like you mentioned like Genetic Genie or LiveWello that will give you a report and tell you have one copy of this polymorphism or no copies or two copies. It's a great way to get a lot of data and we're constantly finding more and more SNPs, but what I try to emphasize to people is that the SNPs have been around for thousands of years, it's the stressors that we encounter, heavy metals, emotional stress that cause these genes to be turn on or turn off.

Methylation plays a big role in whether genes are turned on and turn off, so typically we want things like oncogenes or cancer-causing genes to be turned off, but if we're not methylating well then those genes can become turned on or be turned on. Methylation, it impacts so many different systems in the body. It impact ATP production, CoQ10, carnitine production as well. It can affect mitochondrial function too.

Dave: When I did my analysis, I'm relatively lucky and that I'm heterozygous for two of them MAOA and CBSA360A. Now if you are listening to this are kind of like, "Who the heck cares?" I never actually counted these. These were about 20, 18 or so that you're going to see in a normal methylation analysis, 20 different SNPs.

Tim: Yeah, if you do LiveWello, they have like an 18 page reports, so they'll have a lot more, but Genetic Genie has about 18 to 20.

Dave: How do you spell that? I don't know that one.

Tim: It's L-I-V-E ...

Dave: What's the Livewello?

Tim: L-I-V-E-W-E-L-L-O.

Dave: All right, I'll put that in the show notes for people and we'll do a descriptor of like how you can run your own methylation, but it is really intriguing to just knowing, "Hey, it's not like the 23andMe analysis, I have a 10% greater risk of getting Alzheimer's disease, which is entirely lifestyle based because it's a small difference." Like this, you basically take basic care of yourself and that risk is probably not going to matter, but it is there in your genes. This is like, "Hey, your body doesn't like this is a major risk for you and that if this pathway gets clogged out, because you take too much of a supplement like folic acid, then everything else kind of grinds to a halt and this whole system of cello-detox breaks and then you really get sick." Just that little bit of knowledge I wish I'd had that when I was 20 because I would have just made slightly different choices and it probably would have made me much healthier over time.

Tim: Yeah absolutely, I mean methylation, these other polymorphisms like you mentioned CBS that can come into play because it can elevate sulfur levels or sulfite levels as well as ammonia levels and that can affect brain function. The 23andMe looks at the actual SNPs, but there is a test from Doctors Data that is a methylation profile. Then, there is another one from the European Lab called Health Diagnostics and Research Institute. That one is the most comprehensive. It measures about 15 different markers, including oxidized versus reduced red cell blood cell glutathione, red blood cell folate, red blood cell B12. The Doctors Data is more accessible here. It doesn't take as long to complete. It looks at what's called SAM homocysteine, which are just two metabolites in this pathway. There is a lot of metabolites that are constantly getting converted into other things. Homocysteine, most people have heard about it because it increases your risk of cardiovascular problems. If you have MTHFR, especially the C677T version you would like to have elevated homocysteine.

If homocysteine is elevated, we know that you have methylation issue but it can be normal or even low and that can also indicate methylation problem. Having those other markers like SAM and SAH can be important because looking at the SAM and SAH ratio can kind of give you indication whether you're under-methylating meaning you don't have enough methyl groups or you're methylating, maybe you're taking too much methyl folate or methyl B12.

Dave: We probably just are scared, about half the people listening, going, "I have SAM versus SAH," like to understand these ratios, you would need to dig in a little bit or you go to someone who can help you analyze the data. If you go to these web sites we just talked about Genetic Genie or LiveWello and we'll put those links up, they'll help you do this. You're talking about a \$99 saliva test. Now, you have all this data, you can click around and do your own homework and go, "Oh well, like, this is interesting and funny, these weird peculiar things I know about myself match these methylation results that may be explains why sulphides bother me and why for instance." Something like that may be genetic, so you can start peeling back the onion yourself, but if you don't want to go to this trouble of understand all those things, what kind of a care provider would you go see to get these tests?

Tim: It's a million dollar question because like you mentioned before, 20 years from now, it'll be standard practice but there's really no classes per se you can go to. Ben Lynch does offer some courses here and there, but basically, could be a naturopathic, could be a chiropractor, it could be a functional medicine some providers like myself. I interpret these tests almost every day to look at the polymorphisms but also the functional profiles to see how the cycle is working and look at that in combination with your hormones and your digestive health because I'll pick a polymorphism COMT that slows down how well you process catecholamines, which are things like norepinephrine and epinephrine, basically your fight or flight neurotransmitters. But it also affects your ability to process estrogen, so if you have this COMT polymorphism instead of excreting estradiol or estrogen through the stool, it may just reenter the enterohepatic circulation. That for men, it basically blocks testosterone at the receptor level and can cause all sorts of problems, mood issues. Most people think high testosterone causes problems, but it usually more high estrogen that causes problem.

Dave: When I first started looking into this stuff about 15 years ago and got my first hormone panels in my late 20s, I had way more estrogen and testosterone. Okay, if you ran this \$99 test basically and you understood that you had a problem with estrogen secretion and you had, well I think the affectionate word would be man boobs, like I used to have or the more weight lifter term bitch tits, if this is a problem for you and it's not that fun. I used to be kind of like an A cup, this could be genetic and if you knew that or on the flip side okay, it's that lovely peri-menopause time and you're having similar symptoms and your body doesn't clear estrogen like other women because of your basic methylation pathways. Well, then if you know this, you can do things as a guy to block the conversion of testosterone to estrogen or to increase your excretion of estrogen using natural or pharmaceutical approaches, but just knowing now all of sudden you understand why you've got that healthy A cup or you understand what you've got weird emotional issue that other friend going through peri-menopause didn't have.

This is the way to understand what's happening in your human body, which is why it's so fascinating and it's so annoying that the vast majority of physicians who get three minutes to see someone and really

want to help, they don't have time to learn this stuff and they don't have time or insurance info in order to cover \$100 genetic profile test that can unleash all this knowledge on ourselves.

Tim: Right, yeah like you mentioned, it's important to look at the polymorphisms along with the actual hormone test because a lot of times, you may have the polymorphisms that say you may not excrete estrogen well but when we look at your actual hormones either in blood or 24-hour urine, they may be low even though we expected them to be high because there's so many other various factors that can come into play. That's where you really want to work with the functional medicine provider who looks at all the different parts. There's hormone replacement clinics popping up everywhere that kind of like Starbucks but unfortunately they just look at the hormones and they don't understand how digestion affects liver health, which affects hormones or how neurotransmitters stimulate the production of certain hormones.

When you look at that insular approach, it very rarely produces the results that someone wants.

Dave: It's true. If you look at the body as a collection of just independent systems, you'll fix one and you won't understand why the others broke, but when you realize it's a system of systems, it gets more complex, but it's more fun and it means monitoring, if getting those tests is way more important. I wish that we had known this and I wish that someone had put all of this in some sort of functional usable framework years ago because there's no excuse for me having had to spend \$300,000 on hacking myself and on fixing all these things. Frankly, I spent a lot of that going beyond where I ever thought I would be like, like there's as an element of that that's way upgrading and there's the element of just getting back to like basic and I couldn't tell you I spent \$48,000 here whenever. That kind of investment, most people are never fortune enough to be able to do that. I was fortunate enough to do that but it came at great cost, like I'll drive an older car, so I can spend a \$1000 a month on fixing things or in making things better. I certainly spent a lot of years doing that but what about those people who can't afford that like how do we make this kind of stuff accessible so that's just built into

our health care system? Do you have hopes in your life of that happening?

Tim: I think a lot of it comes down to politics and we got to the pharmaceutical lobbies out of Washington. If insurance companies need us...

Dave: If you pull them out of Washington, is there anything left?

Tim: Well, I feel like they have such an influence. Yeah, no, there's nothing left. There's pretty much all that's there. A lot of people think that if it's pharmaceutical, then it's scientific and research based but what you and I are talking about is completely evidence based, but we can't force people to read the evidence. I think the prices will come down. A lot of times what people don't realize for example if you did, say a full thyroid panel through one of that functional labs that I use, it's a \$150 out of pocket. If you have insurance and you go to Lab Core and have it done and make it deductible, it maybe 600 or \$700. Sometimes it's actually cheaper paying out of pocket and getting that information. Of course traditionally MDs don't like this direct to consumer type testing because they want to be the gatekeeper. It's a pain in their rear, but people are becoming more and more knowledgeable and doctors get insulted because they don't know something.

I think over time prices will come down. I think more labs will come up. You probably saw it, but at the Cleveland Clinic, they're actually opening a functional medicine clinic there with Mark Hyman and so it's gradually ...

Dave: Yeah, Mark is a good friend. Sorry, I didn't mean to interrupt that. I was saying Mark is a good friend and we talked about that on the show when Mark came on because it's such groundbreaking thing that the Cleveland Clinic, which is so steeped in traditional Western pharmaceutical based medicine to have a guy like Mark with his approach to have, the head people there try a detox program and to see it work like that changes the world. I love that you mentioned that because that was the most exciting pieces of news I've heard like in the last quarter.

Tim: Yeah absolutely I mean Cleveland Clinic, Mayo, CDC, they're all kind of the ivory tower academic centers, but if you looked at that functional medicine, most of the time, it's more evidence based than traditional medicine. People don't realize that just because something is a prescription drug, doesn't mean it is evidence-based or they don't know that six out of the nine people that make the cholesterol standards have financial ties to the companies that make statin drugs. Those are stats that are important for people to know. A lot of times, you get called a conspiracy theorist but these are just facts and it's important for people to be informed I think. I think it was in Michigan just a few weeks ago or a few months ago, a doctor was diagnosing healthy people with cancer and selling chemo out of his office, making millions. Things like that happen.

I like to think most MDs, they do the best they can with what they have, the skills and time they're given but more and more are looking for alternatives to the traditional system that we have.

Dave: It's a good sign and when enough MDs are recognizing that they want to do something different for themselves than the insurance system and the regulation say they are allowed to do with their patients. When that happens enough and I see evidence of that all the time because I don't want to have hip replacement surgery. I'll do some preventive stuff, thanks very much, because I replace hips all day long and it looks pretty painful. If that's your perspective and you shift it for yourself, eventually we're going to just see this happen because my experience has been the vast vast majority of people who go to the time and expense and effort of going to medical school, they really actually want to help people get better. When they realize, kind of like maybe you did somewhere in your path that what they're doing doesn't work as well as they wanted to, they will start changing because they're motivated by helping and that's a wonderful thing that bodes well for the future medicine.

Tim: Oh absolutely, yeah it's definitely a lot different than when I first started delving into functional medicine 12 to 13 years ago. I don't even know if integrative was a term then but there was no Facebook groups for MTHFR or any of that. I was going to the library, doing research, buying

books things like that. It's definitely taking steps in the right direction I think.

Dave: Well Tim, we're coming up on the end of our time for the show today and I want to ask you a question that everyone on the show has answered except that one guy I forgot somewhere in the early days. That question is given all the stuff you've learned, in your experience, the screws you had put in your mouth, your medical knowledge, but just your life's path, your top three most important recommendations you make for someone who wants to perform better? If you want to kick more ass or whatever it is you do, do these three things, what would they be?

Tim: Number one, fix your sleep because it affects so many hormones, inflammatory cytokines, brainpower, motivation, everything. Optimize your sleep, which you have a lot of great articles and podcasts on. Number two, make sure that your digestion is optimal. That may involve taking betaine hydrochloride or replacement stomach acid or probiotics because every nutrient in the body has to come through the digestive system. Fix your sleep, optimizer your circadian rhythms, optimize your digestion. Then number three, I would say optimize hormones, anything from adrenals to sex hormones like testosterone and progesterone because they literally do effect every tissue in the body, every cell in the body. That impact brain function, immune function, risk for cancer etc.

A lot of people don't know this but if thyroid function is low that slows down detoxification as well, so you become more toxic. Fix your sleep, fix your gut, fix your hormones.

Dave: Very very sage advice and thank you for sharing it. Where can people hear more about your work, where can people find you online?

Tim: It's www.HealYourBody.org and also they could a contact me via email, it's drtim072981@gmail.com. Those two ways, they can contact me there.

Dave: All right, we'll put that in the show notes, so if you head on over to bulletproofexec.com, we'll have a note of this, so if you wanted to get



some of the letters we talked about or any of the other links, those will be in the PDF you can download. Tim, thanks again for being on the show.

Tim: Absolutely, thank you so much for having me.

Dave: If you enjoyed today's episode, I would love it if you would take a minute to say thanks and the way you could say thanks is by supporting this work by picking up your next order of [Bulletproof Coffee](#), better yet pick up a copy of the [Bulletproof Diet](#) and give it to a friend because you'll upgrade their brain, give them a little bit more will power and basically share the love. It took an enormous amount of effort to condense the quarter million or so words on the Bulletproof website down into an actionable plan in the book. I think it's worked and the feedback on Amazon has been positive. Thank you for leaving your reviews for the podcast, leaving reviews on Amazon for the book after you've read it. Thank you for supporting Bulletproof and supporting the podcast. Have an awesome day.

One of the things you can do to make your brain work really really well is you can remove toxins from your body. One of the most important antioxidants and toxin binding substances in the body is called glutathione. That's why I created [Upgraded Glutathione Force](#). This is a radical innovation in the glutathione world, small as it may be because we use a patented technology that binds another molecule onto a liposome, so it's liposomal but it absorbs, in studies using this form of molecule up to eight times better than normal liposomes that don't contain the added boost. Check it out, Upgraded Glutathione Force on [Upgradedself.com](#).

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