



Transcript of “Resistant Starch Revealed with Richard Nikoley and Tim Steele”

Bulletproof Radio podcast #124



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Dave: Hey, it's Dave Asprey with Bulletproof Executive Radio. Today's cool fact of the day is actually a trivia question. It was 1831. In front of his distinguished colleagues at the French Academy of Medicine, Professor Touery drank a lethal dose of poison and lived to tell the tale. He combined his deadly poison with an antidote that's now commonly used in emergency rooms for acute poisoning. Do you know the name of the antidote?

Before we get going, the podcast videos recently got added to the iTunes video channel, so if you're enjoying this in your car or on your iPhone or something, check out the video, and if you'd do me the favor of leaving a review, it will help more people find it. On today's show, you're going to notice that there's actually three people on. There's me, and there's two guests. Those guests would be Richard Nikolay and Tim Steele. We're going to be talking about poop. Guys welcome to the show.

Richard: (Laughs) Thanks. Great intro, Dave. (Laughing)

Dave: Let me give you guys a better intro than that. Richard, you and I have known each other for, I think, four or five years now. First met over some only slightly-off oysters, and you're an interesting guy. You've been a Navy officer. You've been an entrepreneur, and you write freetheanimal.com, which is kind of a paleo-ish sort of blog. You're paleo, but you keep eating starch and doing weird stuff like that.

Richard: Yeah. Foundation, yeah. Some rice and potatoes and even some ... I made the best pot of beans ever yesterday.

Dave: Beans? Oh, my God.

Richard: [crosstalk 00:01:46].

Dave: Oh, man. All right, but anyhow, I'm actually a fan of your blog. I appreciate your writing and your research and your entire lack of

caution when experimenting with yourself, something that I share. Our other guest today is Tim Steele. He is better known, actually, as Tater Tot, and he's from the same general quadrant of the world as me. He's from Alaska. I'm from up here in British Columbia, where we can almost see Alaska, just like the Alaskans can almost see the Russians. Tim writes guest posts on Free The Animal and on Dr. Grace Liu's Dr. BG Animal Pharm blog, and you've heard Dr. Grace Liu on this podcast, sort of. Our audio quality was bad, so we put that just on YouTube, and I'm going to get the transcript of Dr. Liu's interviews. It was really amazing, but you just couldn't hear everything she said.

You could say Tim is the main stay behind the rediscovery of starch and not just any starch, but specific starches that feed gut bacteria and don't raise your blood sugar, things that don't cause the problems that normal starch causes. At least they don't cause those problems in some people.

Today, we're going to talk resistant starch, which has been kind of taking the Paleo community by storm. I've talked with Mark Sisson about this recently, and he mentioned on the podcast that he wished he'd known more about this earlier on or paid more attention to it, because he'd seen the research. I'm really pleased to have two of the leaders in bringing out only a couple hundred studies of bringing these to light. I don't know which one of you wants to take this, but let's define resistant starch for people who are listening and maybe don't quite know much about resistant starch.

Richard: Tim.

Tim: Yeah, sure. I could talk about this forever. Resistant starch is a starch granule that's found in a lot of different plants; potatoes, bananas, nuts, grains. Anything that's starchy kind of has a characteristic of resistant starch in there. When the plant is not cooked, when it's in its raw state, the starch granules are intact when you eat them, and they resist digestion by your stomach acid and your small intestine, and they end up in your large intestine, where they serve as food for your gut bacteria. There's four different types of resistant starch.

Resistant starch one is found in nuts and grains, and it's preserved in a shell like in a nut. Then there's resistant starch two nestled in bananas and potatoes mostly. These are just the starch granules that are in the plant. Then resistant starch three, if you cook those starch, like resistant starch two, if you cook them, they expand, and they turn into readily digestible starch. When you cool them down, they form a crystal structure, and they once again become resistant to digestion. That's called resistant starch three. Then there's another resistant starch four, and these are man-made. If you've ever looked on a food label, you'll see something like polydextrins or modified starches and things like that, and those are resistant starch fours. These are man-made. There's mostly a trick by the food industry just to get more fiber in your food. It has some other properties that they like, so it's added in in a lot of manufactured processed foods that we try to stay away from.

Richard: Let me add one thing there on the RS2, which is in things like the green bananas or the potato starch, and just to distinguish between potato starch and potato flour, the potato starch is the granules in a raw potato. You can do it yourself by grating and working water. Then all those granules will fall out of there. Potato flour is basically a cooked potato that's ground, cooked and desiccated and then ground up into flour.

One way to understand the difference between the RS2 granules of starch and rapidly-digesting starch is popcorn. What makes popcorn pop is there's a little bit of moisture inside that granule, and when it gets to a certain temperature, the thing just goes "poof", and that's exactly what resistant starch like potato starch granules are. When you get to about 140 degrees, they will pop just like popcorn. One thing you can do is take a rounded teaspoon, stir it up in some water, and you'll see it sinks to the bottom like a non-Newtonium fluid. It's like clay. You stir it up, pop it in the microwave for a minute. It comes out, and you basically have hair gel.

Those things have all popped at that point, and that's why it makes a good thickener for sauces. You do a little slurry and dump it in there when it's boiling, and that's what happens. Those little things pop, but that hair gel kind of thing is all dispersed, and so you get a thickening for

sauce. It's one of the better sauce thickeners, actually. It works better than corn starch.

Dave: This is which one? RS2?

Richard: I'm talking specifically of potato starch, but that's basically why you can't cook RS2 and retain ... Well, some of the foods do retain a small portion, but then once it's cooked, as Tim said, and you cool it down, these things re-crystallize. It's not the same granule. It's more of a tight crystal structure that has the same affect. It resists digestion. There's actually, I believe, Tim, there's actually different bacteria that like the RS3, so it's a good thing to get both the RS2 and the RS3 integrated.

Dave: In the course of creating the Bulletproof diet, which admittedly, now, I think Paleo and some of my recommendations are coming closer and closer together, when you get guys like Chris Kresser coming out, saying you have to modify this and you can add this, and I love the direction that thinking is going, but the learning that I got out of this is that all proteins don't affect the body the same way. There's a difference between soy protein, egg protein, and collagen protein. They're just different substances, just the fact they're all proteins ... so is spider venom, but okay.

Then you look at sugars. There's different sugars. Fructose behaves differently in the liver than, say, sucrose or glucose, and same thing for fats; butyric acid, MCT, saturated fat and corn oil are just different animals. The fact that they're all fats doesn't really matter, because they do different things. I've been, for a long time, since I lost 100 pounds, relatively suspicious on the starch side of things. I'm fine with some white rice and all, but I know that people tend to get fat. Admittedly, I have a terrible history from a digestive perspective, because I was on antibiotics just about every month for 15 years, because I had chronic sinusitis that just wouldn't go away, so they kept putting me on antibiotics over and over and over as a kid and strep throat as well.

My gut biome is probably as bad as it gets. At least, it was. I managed to, after \$50,000' worth of probiotics, I was actually on one of the ones we're going to talk about today for two, two-and-a-half years in the late

2000s without a lot of results, and I played with some starches, but I always did terrible on starches, because I didn't understand these different types, not only of starches but of resistant starches, so I think you guys are bringing something that's worth understanding to light, and in the new "Bulletproof Diet" book that comes out December 2nd, I'm actually giving you credit for, "Hey, these guys have talked about all the science that everyone ignored," so I appreciate you've done it.

Richard: There's ... What was the last I heard? There's roughly, I think, about 50 different kinds of starch structures, and RS1, RS2, RS3 are the three types that are resistant to digestion in humans. As far as how each of those other 47 or so that are digested by us, how they actually play in that digestion, how fast they're digested, or whatever, is something I don't know. I would speculate that there's, just like with different proteins and with different fatty acids, there's got to be perhaps different things that go on there. Sugars as well.

Dave: It's fascinating, because it used to be very difficult to get a good view of what's going on in the gut. There's a company called uBiome. I had them at the first Biohacking Conference about a year-and-a-half ago. They were promising to sequence the human gut biome, and I haven't got my results but I sure have been waiting for a while. There's the American Gut Project, which I believe both of you have done, right? Looking at the species [inaudible 00:11:09] diet. Richard, have you?

Richard: I have not, no.

Dave: Okay. It's on my to-do list, but I haven't done that one either, because I kept expecting my uBiome results, and I've done some other analytics work, the doctor's data, comprehensive stool analysis kind of thing, where you poop in a tray for three days and all that. I worked on fixing my gut a long time ago, and when I got the Bulletproof Diet thing down, I stopped farting. I stopped having all of these problems that really were significant for me, and it's been working for a very long time, but I'm always intrigued. I read your blog, Richard. Tim, I saw all your crazy comments on there.

I went out and got my plantain flour, my potato starch ... This is kind of embarrassing to admit, but okay, I know that I'm one of the people that doesn't do well on potatoes. They tend to cause joint pain, and I don't respond well to nightshades, so one of the comments said, "Well, you can just use it rectally," and my plantain flour hadn't arrived yet, so I actually used some potato starch in through, we'll say through the exit entrance there, and it did seem to have some effects on stool consistency and whatever, like positive effects, but I don't really have big problems there, anywhere, so I'm like, "Okay, there's more bulk than there was before," and I started using the plantain flour, and I started getting pretty foul gas. I just don't have gas anymore on the Bulletproof Diet, so I'm like, "This isn't a good sign, but it could be an adjustment period."

I was taking raw kefir that I make myself from grass-fed cows on the island where I live, super properly done, and I started getting hives from this stuff, and so I quit the resistant starch, and my hives went away, which [inaudible 02:12:57], "All right. It doesn't mean it's bad." I've taken pig whipworm and mixed it into all kinds of stuff, but it definitely made me think, "All right. There's something going on here, and how do I know what I'm feeding."

My first question for you guys is, Tim, you live as an Alaskan mountain man. You carry chicken manure. You're at one with the earth and all that. Richard, you're a Silicon Valley dweller, and you certainly don't get that ... Even if you're taking a few capsules of probiotics, certainly, I've been doing that for 20 years now, how do you know what's going to grow? It's like, you pour fertilizer on tumbleweeds, you just get bigger tumbleweeds, so how does resistant starch affect what's in the gut biome?

Tim: Yeah, it is difficult. One thing we found is potato starch is almost like a litmus test for what's in your guy. Potato starch is just a food. It's a fraction of a food that every human should be able to eat without major repercussions. What we're finding is probably half of the people that try potato starch probably have an issue with it of some sort, even if it's just really bad gas right away, but the kind that goes away. Other people get, like you said, the hives and joint pain. Some people it helps their sleep.

Some people, it makes their sleep worse, but everybody should be able to eat potato starch. It's one of the ... not potato starch, but just starch in general, but it's one of the foods that we grew up with from the time of a million years ago, when we were eating raw yams on the African plains, and you should be able to eat potato starch. If you can't, then you have something going on in your gut.

A lot of the time, what it seems like, their yeast overgrows. We had one lady on the phone named Nancy. She tried potato starch, and it gave her a really bad reaction. I don't remember what ... the instant diarrhea that lasted for three days and stuff like that. She got a gut test, and she had a major overgrowth of a pathogen called morganella.

Dave: Oh, that's bad stuff.

Tim: Twenty-five percent of her entire gut flora was made up of morganella. To me, I didn't even think that was possible to have that much of a pathogen in your stomach, and she'd been using low-carb and different dietary interventions for years, and all of her problems started after a bunch of rounds of antibiotics, so she's been nursing this morganella along for years. When she tried the potato starch and had instant bad reaction to it and got her gut results back, it's like you can see right off what happened. Then she started on with the probiotics. I think she used the Prescript Assist and some others. There were days when her diarrhea was clearing up. The last I heard, she's still doing [inaudible 00:15:50] from some botanicals and some charcoal, things like that, trying to get rid of this morganii before she restarts the potato starch, but yeah, people have all kinds of things in their guts.

Even back in the early studies with potato starch and prebiotics in general, even just healthy screened people that were doing these studies, they found about 25% of the people couldn't handle the prebiotics, no matter what it was ... [inaudible 00:16:17], potato starch, and that was twenty-some years ago, so now it's probably even worse.

Dave: It's a pretty big supposition that, "Okay, everyone should be able to handle these types of starches. In my experience, a lot of people don't, so the question is is the problem with the starch or the type of starch, or is

the problem with the people, or is the problem with the gut biome? If people did modify their gut biome in order to effortlessly digest starch as well as the fats, which are kind of the foundation of how I perform at my best, how do we know what other effects that's going to have on the body. Are you going to die 20 years sooner? Are you going to get yeast? Are you going to get brain fog? Are you going to get problems with histamine-forming lactobacilli, stuff like that?

Richard: There's always the counter-argument to all of this stuff that we knew, that people live, on the average, longer than ever, so of course we know that living longer is ... you want to live well as long as you possibly can, and we've gotten to the point where we can prolong someone's life 20 years. In a lot of cases, it's not much of a life, kind of like a brain in a vat sort of a thing in some cases. If everybody gets this healthy gut, does it mean that we kick out at 50 instead of ... (Laughing)

All I can go by is what I've seen in myself and what I've seen in others. I've had sinus allergies all of my life. I was one of these ones, the first with the potato starch, and I was doing the potato starch, buying green plantain flour, green banana flour, even a little tapioca starch, some [FOS sinula 00:18:12] and that sort of thing, so I had ... basically, the only negative that I had was the gas, which could just be so hilarious sometimes. It was beyond ... It's like, "This is just too funny." What happened was a lot of people, they get in this mode of like, "Okay, I have to take it every day," but what I've always done is, number one, I varied the dose. I never take the same ... I may take one teaspoon one day and five tablespoons the next, and then one day I'll take nothing. Then every once in a while, I'll go three days without ... nothing, more modeling like a food kind of thing instead of just pounding it. The gas resolved. I had the great dreams. I felt good, all of these positive benefits.

Then once I finally broke down and decided to take the three soil-base probiotics that Dr. Grace had recommended, the Primal Defense Ultra, the AOR Probiotic-3 and the Prescript Assist.

Dave: Those are the same three I've been using for ten years.

Richard: Once I did that along with the resistant starch in the various forms, I couldn't believe it, that all within three days ... I've always had to carry around a paper towel to blow my nose. I still do, but it's literally 80-90% less, and when I sleep at night, I can breathe through my nose. I always ... I'd wake up in the middle of the night with dry mouth because my nose is clogged. That is reduced by so much. My point is that I think people need to just play around with this thing. I said to someone this morning in a comment on my blog, I said from my perspective, about 80% of the people that don't have any problems with potato starch or resistant starch in general and they see some benefits, farting aside, because that typically resolves for most people in time.

Then there's 20% where it either doesn't appear to do anything for them, or they get some sort of adverse thing. Then you add in the probiotics in combination with it. I think 20%, you get more like half to maybe a few more of those, and even with the 80%, like myself, can see more improvement than they were getting by adding the probiotics. Then you're going to have that five to ten percent, who it's not going to work, and you're probably looking fecal transplant or something like that with some people that their guts are just so jacked that there's no coming back. I think in some years, we're going to see fecal transplant tourism. These people will start going to Tanzania to get a fecal transplant from a [inaudible 00:21:20], who's never been exposed to antibiotics, any pesticides or toxins or anything like that.

Dave: It's funny. Natren makes a probiotic that was cultured from the vagina of a woman in 1972, who had never taken antibiotics, and so I tried making sauerkraut with that, and that sauerkraut must have been the highest histamine sauerkraut I've ever had. I ate a cup of that stuff, and I was just completely ... I felt like crap after I'd eat it for three days of brain fog. It was really bad. It's kind of funny. I've also thought for years, knowing that I've been on antibiotics for a good portion of my life that, "Yeah, fecal transplant is a great idea," so I thought about posting on Craig's List for that. (Laughs) How do you find someone ... "Hey, let's ... Can I have some of your poop?" It's such an awkward thing. Plus, you don't know what you're getting, right, so you might also pick up a parasite. You can get all sorts of weird stuff. I am not certain what the future of that's going to look like, but I hope it's a little more quantified.

The other question for you guys ... part of that is we evolved, and this is going back to the ancestral health side of things ... We evolved eating certain substances on a regular basis. What's in the world around you? That's what you eat. Now I have Pizza Hut, Taco Bell, Chinese food, and we're eating stuff from Peru one day and somewhere else another day, and it seems like our gut biome would not change on a day-to-day basis, so you need to be eating at that Thai restaurant every day for a month for your gut bacteria to adjust themselves. What's the answer going to look like for people? Not just resistant starch but for the gut biome in general, given our diet isn't conducive to feeding the bacteria the same way on a regular basis? Is there an answer, or do we need to mix poop from 20 different places and take it as a capsule? Any thoughts? I don't expect you know the answer. I just want to hear your thinking about it.

Tim: The gut microbiome is pretty amazing, and I think it actually is changing on a by-meal basis. It doesn't require weeks and weeks of different meals to adapt to different plates of food, but there's only certain things that really get down to the large intestine that serve as food for all these different microbes that are down there. Just using the standard American diet, you know, go into McDonald's twice a week, Burger King and fast-food whatever and eating a lot of pizza and drinking beer, you're probably giving your large intestine maybe three to five grams of resistant starch at the most, and most of that is coming from potato chips and the burnt ends of French fries and little things, but your guy microbes are also getting other things. They're getting bio-acids. They're getting sloughed off skin from your stomach and small intestine and kind of recycling the mucous layer of the large intestine.

There's also some indigestible portions of proteins ... [licoproteins 00:24:35], I guess, they call them down there. There's all kinds of things. As long as you're forming a turd, your gut microbes are [inaudible 00:24:44]. If you have constant diarrhea, that means you don't have the gut microbes to form a turd. It sounds crude, but that's the reality of it. That's like the lady with the morganella overgrowth. She was just chronic diarrhea from it, so all her gut microbes weren't the type that form [inaudible 00:25:06] stool, number four stools on there. When you start adding resistant starch to your meal on a regular basis, you start eating the [inaudible 00:25:16] rice, [inaudible 00:25:20] potatoes and

even [inaudible 00:25:21] beans like we like. It's like you start getting more resistant starch. What that does is require several different microbes to eat the resistant starch.

There's what they call keystones and co-feeders. There's a big diversity of gut microbes in there, and these things are all engaged to produce [inaudible 00:25:40] and producing other chemicals. Some of them produce chemicals that other ones eat, and the microbial populations, they come up to meet this new food source. By just starting to eat in a better way, your gut microbes are going to be a better profile.

Dave: What about ketosis. If we're on a zero-starch diet, which for a lot of people it creates incredible mental clarity. You get that ketosis, and then of course you add starch in. My recommendations are every three to seven days you have a day where you're eating a substantial amount of carbohydrate, both for the gut biome and also just because you don't want to stay in ketosis forever. At least I don't think that's advisable. What's the timing look like on this stuff?

Richard: I think that's good advice, because I think one reason for the mental clarity with ketosis is the same way you can have mental clarity if you chop off your finger. You'll have extreme mental clarity, but do you want to chop off your finger? No. In other words, ketosis is an evolutionary adaptation to starvation. The thing is, a lot of people don't understand that yes, you can go into mild ketosis by restricting carbohydrate, very little, but you can go into ketosis on a pure sugar diet if your calories are low enough, right?

Dave: Yes. Very low calories, but yeah.

Richard: Well, we had people, when back before this whole resistant starch thing, there was this thing going around called the Potato Hack, which that's where Tater Tot Tim got his name, where people were doing basically that Chris Boyd deal where you eat almost nothing but potatoes, maybe a little ketchup on it or little spices or whatever, but a little bit of olive oil or something, and you drop weight precipitously. Well, come to find out that people who were doing this ... some of them were measuring their ketones and finding that eating their fill of just potatoes every day,

they would still be in ketosis, because the most they could get to was about 1300-1500 calories a day, because the potato was so filling, and that was a good 500, maybe 800, 1000 deficit calories, and they were in ketosis.

Ketosis ... I like to look at ketosis as a survival adaptation when you have no food or not enough food. Maybe that's where the mental clarity comes from, a survival of the fittest kind of deal. It's something I don't think is good in a chronic state, and so I support your idea that every few days, load up on carbs, however you do it, whether you eat fruit or drink some fruit juice or get some starches or whatever. I think that's a great idea. One other thing I wanted to briefly mention ... When you were talking about all the different foods and what you have around you, Pizza Hut and everything like that, too, well, I think there's probably some hormetic benefit from every once in a while engaging in those toxins.

To give you an example, yesterday I posted this woman basically used, and she's a medical practitioner, she had a salmonella infection for six months from eating some bad chicken. As a medical practitioner, she was banned from work. She has to have two consecutive stool samples that don't have the salmonella in it. She couldn't, da-da-da-da-da, so she goes on the potato starch and those three probiotics for, I think, ten weeks or something like that. Boom. Got rid of the salmonella.

Dave: The three, just so people listening ... Prescript Assist, which is the SBO I recommend as well, and I think a lot of people are on an SBO. The other one was Advanced Orthomolecular Research Probiotic-3, which is a super-cool one made by a guy who is just a gem of a human being, and the other one, the Primal Defense Ultra, is Jordan Rubin, who has actually been on the Bulletproof podcast, who kind of saved his own life. These are the three time-tested good-quality ones. Everyone listening is going to want to know those three. Go ahead.

Richard: She got rid of her salmonella from it. She brought her fasting blood glucose from 130 down to the 70s, where it stays every day now, and she lost her gluten sensitivity. For five years, she was Paleo. She couldn't eat the slightest bit of gluten, or she said she'd be a swollen itchy mess,

and now she's not. I guess I could say that my point is that there's two ways to approach the Bulletproof idea; one is you can just eliminate, eliminate, eliminate everything that you're sensitive to, or another approach might be to figure out a way that you can tolerate some ... tolerate it to the extent, not that you're eating it all the time, but that when you get it, it doesn't send you into crazy things because you're so pure that you can't tolerate any amounts of it anymore. I hope you get my point on that.

Dave: I do get your point on that. There's a reason that I've dropped so much money on so many different kinds of probiotics and other things. I've done colon hydrotherapy and coffee enemas. Pretty much, if it's been written about and it affects the gut biome, at some point in the last 15 or so years, I've probably tried it with the exception of a fecal transplant, and that wasn't because I wouldn't do it. It's because I don't know where to get good poop. Otherwise, I'd do that, too.

If you're watching, Tim just raised his hand, which is only slightly disturbing, but FedEx me a nice one, would you? (Laughs)

Richard: People were joking in my blog comments for a while that Mark Sisson needs to add another product to his health line ... his own stool.

Dave: He brings good stuff. I can see it. (Laughing) On the are-you-so-pure-you-don't-handle-stuff, it's a rough thing, because a lot of times you do want to go out to a restaurant, and people get used to feeling like the laser focus. They're kind of like, "I guess I could do it," and that's one of the reasons that I do the Upgraded Coconut Charcoal, because if you're going to eat stuff, there's a question. Are you getting toxins from the food. Certainly, some foods you do get toxins directly from the food and they do affect your brain. Even if you have a good gut biome, they still affect your brain. If you combine some of the toxins, preferentially using an absorbent agent, okay, that makes good sense. By the way, that's the answer to the trivia question at the beginning, was activated charcoal.

That's one thing, and then eating adequate fat changes your blood sugar response if you're eating a lot of sugar. There's various hacks like that. At the end of the day, I haven't seen something that makes me believe

MSG ... "Oh, I should have a dose of MSG once a month so I'll be more resilient to MSG," like I think those just don't have a place. It's very fine-grained, but there is a great argument that says, "Don't be in too steady of a state. You should wobble," which is why I'm like have a re-feed day, but I do know that the people I work with and in my own experience, that my re-feed day is Carl's Jr. and Coke and cheesecake or whatever. I'm going to take at least four days before I get the laser focus and the brain that's always on and the effortless state that I'm used to living in.

What I'd love to see, from the research you guys are doing and certainly my own self experiments with it right now, is if I can increase my resilience, I can make it easier to be in that state that I'm seeking on a daily basis. That would be an amazing gift, and I'd love to have more people feel that way more of the time, not just me. Is that your experience. What's your energy like when you're on a high RS diet versus on a clean diet where you feel great on a clean diet, or did you never have that? I don't know.

Tim: Yeah. I don't know. I'm doing great with the high RS diet, and I've been doing it now for well over a year. I'm kind of like you with the Biohacking stuff. I like to get medical labs as much as I can. I work in a hospital, so it's really easy for me to go to the lab and get blood drawn.

Dave: Oh, fun.

Tim: I have [insurances 00:34:05] so I can use one in one quarter and another on a another quarter, or they like to do it twice a year, so I kind of got them all separated out, where if I went, I could get labs every three months and track my cholesterol and track a few other markers that I like to see, but yeah, my energy level's great. My cholesterol's great. All my ... All the standard labs that they've tracked have been perfect. My A1c dropped from ... I think at one point it was up around 6.0, which is almost diabetic, prediabetic. Now it's like 4.7, which is right at the very bottom of the normal range, so everything is working out perfect as far as the labs.

Dave: You've lost a ton of weight, Tim, right?

Tim: Yeah. What happened ... My story is similar to yours. I was in the military, and I spent a lot of time over in a desert back in 2004 right after 9-11. At that time, they thought there was a big anthrax problem, so what they'd do to make us bulletproof soldiers is they shot us full of Cipro.

Dave: Lovely.

Tim: [inaudible 00:35:21] five points we went in. I think we got a Cipro booster, five months, and during that time, I went from pretty healthy, but my digestion just tanked. I was having heartburn and GERD. You couldn't even get Pepto-Bismol at the little store they had there at the post we were at. When your family would ask what you want, they're expecting you to say cookies and ... Told them to send TUMS and Pepto-Bismol. We just thought it was from the crappy food we were eating in the little dining facilities, but people ... We weren't sleeping. People were kind of going crazy and getting sent home. Now there's all these post-traumatic stress disorder, and I know that all that's linked to what they did with the Cipro. That's going to be the new Agent Orange. Wait and see.

When I got back from there, that was in 2004. That's the last antibiotics I've had. From 2004 to about 2008, I gained about 70 pounds. I went full-fledge metabolic syndrome. My A1c and fasting blood glucose shot up. I gained all this weight. I was on cholesterol medicine, blood pressure medicine, all that. Long story short, I was doing everything the doctors were saying, eating whole grains, lean meat. Then I developed gout, so I couldn't exercise anymore, just one thing after another, so I started looking around on the internet, found Mark Sisson and Primal Blueprint. I found you. I had your food pictograph up on my refrigerator at one point. I was doing all the stuff. I was doing the Bulletproof coffee with the stick blender. I was doing everything that was against what the doctors were telling me to do and it worked out great. Within six months, I was off all my medicine. I lost ...

Dave: Love it.

- Tim: ... 40 pounds in that first six months. My gout completely disappeared, and it was great, just like you guys with the Bulletproof and the Primal and all that, and everything was just great. Then things started evening out. I lost about 100 pounds. Then I started getting the low carbs. I wanted to lose another 10 pounds, so to do that, I'll cut out all the carbs. I'll go to zero carbs. I did all that, and it was dry eyes, cold hands.
- Dave: It wrecked my house. I had to stop after three months. It's bad news.
- Tim: It was the same here, and I think I was on your site, where I came across that it was like every couple days eating some starches, and that was just about the time of the safe starch debates. I adopted that pretty heartily. That was a couple years ago. I started eating rice and potatoes, and then I started reading about resistant starch. About a year and almost a year and a half ago, I came across potato starch as a form of resistant starch, so I started doing that, and I talked Richard into doing it. Richard started it. Then we started blogging about it, but yeah, I would say my energy levels have been great. My brain energy has been great. My labs have all been great. I guess I'm talking a little too much.
- Dave: No. Not at all. I think people after fascinated to hear this stuff, Tim, because you started monitoring. You looked at what works. You got somewhere. Part of the whole philosophy that I'm really setting out in the Bulletproof diet book here is that there's a bunch of suspect foods that are probably not serving you well. You might want to see how it feels to be clean for a little while and then start adding stuff back in and see what it does and maybe measure the results. There's even an app that looks at your heart rate. If you add something in that messes you up, your heart rate's going to tell you before you feel it, really. There's all kinds of cool hacks that we can do.
- I would love to be able to say, "Yeah, I take two spoonfuls of starch. I maintain my mental things. My kids don't laugh at me because I fart all the time," stuff like that. I can't say I'm there yet, but my first experiment with resistant starch didn't go well at all. This current one I'm in right now, I've been taking arabinogalactan, which speeds a specific species in the gut that allegedly makes you more resilient to aflatoxin, which is an interesting Bulletproof skill to have. That stuff,

man, like I don't even want to be in the room with myself, much less anyone else, but after three or four days, it started calming down, so I'm eager to do another study. I've been using the corn-based resistant starch, the high-amylose starch, because the potato starch still ... I take some potato, I get rashes from it. I don't believe there's a lot of lectin in it.

I also, I haven't actually published this, but I ran ... One of the concerns with potatoes that I have is there's about 20 different things during harvesting and storage that make the potatoes go wrong, so they make a lot more self-defense anti-nutrients. They have fungal problems. These are well documented in potato farmers. The rest of us, like, "Ah, I just ate a potato. Sometimes I felt good, sometimes I didn't," but the variable was the potato, itself. I'm like drying potatoes [inaudible 00:40:45]. There's got to be mycotoxins in there, so I sent them off to my labs, and we ran them through a medium sensitivity test.

I don't want to say the brand, because I did one sample, so I don't want to imply that the brand ... it's a major national brand of potato starch. It came through with flying colors, like as low as it gets. I don't think there's a mycotoxin issue in it, but I can tell you I still get rashes from it, so maybe it's a lectin issue or maybe it's a gut biome issue. For people who are listening to this, if you're going to experiment with this, check out the stuff that you guys have written on Free The Animal for sure. There's what, 900 comments in that, Richard?

Richard: There's now roughly 100 different posts that are tagged resistant starch, and it covers the board from stuff where we, where Tim and I have dug up research, everything, every topic you can think of. Most of those posts have at least a couple hundred comments. One post has 1000 comments. It's safe to say if you started reading the Bible today and started reading all those posts and the comments, you'd probably finish the Bible first. It's huge at this point. It's huge at this point. One thing that's good about reading the comments is that you have ... It's mostly positive anecdotes, but there's plenty of negative anecdotes there, too.

Then there's also, if you're able to look at it through time, you can come and say, "Wait, so this person says this," and then later one way down

the thread, or maybe even on another thread, they're like, "Hey, I did this, and this helped," and so I'm on my way. That's one of the things that got me convinced that most people need to get on probiotics, SBOs as well, because one woman was having ... the potato starch was giving her headaches, like migraines, like serious headaches. She took the ... I think it was the Prescript Assist was the only one she took, and it was like, boom, headache's gone. It's so complex, what you're dealing with. You're dealing with up to a thousand different species with a genome that's 100 times our genome.

Our genome is one percent of everything that there is about us. When you say, "Is there a genetic component to obesity?" Yeah, but it may be the 99% of the genes that is the big component to it, right?

Dave: Tim, do you mind if I talk about what's in your gut specifically? I saw your labs. Grace shared them with permission, but can I talk about it on the air.

Tim: Yeah, yeah.

Dave: I looked at all your different species. Quite impressive, but the one that stood out that made me want to high-five myself, although I actually don't do that when no one's watching, is that your lactobacilli count was relatively low compared to all of the other species you had. Did you notice that or have any thoughts about it?

Tim: Yeah, and I did think that was strange. Prior to that test, I had been, actually, taking several probiotics with lactobacillus in them, because in my American gut, I think lactobacillus was nonexistent. I don't even know if it was 0.01 or less. I don't even know if it even showed up on there. I thought that was really strange, because I eat a lot of fermented foods, a lot of sauerkraut, and I'm around the farm and stuff like this, so I should be full of the stuff, but I have a feeling that a lot of people ... the lactobacillus just doesn't stick around or it's kind of in a biofilm or isn't in your feces, so it doesn't show up on the reports. Yeah, I wasn't worried about it at all, because I think that everything that's going on in my gut is really healthy compared to what's in a healthy gut.

Dave: It actually supported a hypothesis that I've had for a while. I wrote a really popular post called, "Why Yogurt Makes You Fat and Foggy." Some of the species of lactobacilli are histamine formers and their peroxynitrite formers. They'll take nitrates and make them toxic. I'm sorry ... Those are nitrosamines, not peroxynitrite, so they're nitrosamine formers. Even the big, a while back, red meat raises TMAO and causes ... That's also a gut bacteria-mediated thing, but those are mostly lactobacilli species. Some of the species that you can take cause negative changes in the gut and their alleged probiotics. I know when I take those species, I get brain fog, and I can grow a muffin top like no one else, and it's lactobacilli mediated. I also know when I drink Bulletproof coffee, the phenols in the coffee or when you eat blueberries or any of the brightly-colored vegetables, you're feeding the bacteroidetes rather than feeding the firmicutes.

Thin people have lots of bacteroidetes. You do, by the way. When we looked at yours, you have lots of those, and they have less firmicutes, which includes lactobacillus. I think some species of lactobacilli are fat people bacteria, and they make you slow and they make you foggy, and they make you more susceptible to things. There's probably some great species in there, too, but when you clump all of them together, it's just like saying all starch is good or all starch is bad or all protein is good or bad. Lactobacilli are fat people bacteria. Not all of them, but enough of them that I'm scared of them.

Tim: Yeah. I agree with you on that. Did you ever read up about *Lactobacillus plantarum*?

Dave: Yeah, I was looking at what Grace was saying about that, and I certainly ... In the years of research, I've taken a few *plantarum* once. That's ... Primal Defense Ultra contains *plantarum*, right?

Tim: Yeah, yeah. I was reading up on that, and one place where it's really heavily concentrated is decomposing feathers, so like chickens ... If you raise chickens and stuff, they have a lot of it on there. They even ... the add composted feathers to cow food, and that makes the *Lactobacillus plantarum* grow in the foods. You get the microbes in there [inaudible 00:46:56]. Remember, everybody used to use old feather pillows. It

seems like at night, you're sleeping on this feather pillow, your slobbering on it.

- Dave: (Laughs) A fermented feather pillow. Sounds like another product maybe you can get. Maybe you can get Mark Sisson to sell it along with his poop. (Laughs)
- Tim: The Bulletproof product for you. I want some royalties on that one. Any of your Google or any search engine, type in Lactobacillus plantarum and BDNF, and I know you know what that is.
- Dave: Oh, absolutely.
- Tim: There's a strong connection between the L. plantarum and BDNF, which is brain-derived neurotrophic factor.
- Dave: Neurotrophic factor, yeah.
- Tim: The L. plantarum actually increases the BDNF in everybody, every animal that they studied it in. There's a connection there with anxiety, depression, Alzheimer's, things from aging, so old people. Give them a feather pillow. Tell them to slobber on it.
- Dave: (Laughs)
- Tim: I'm thinking that there's something to that, because that's another thing that's disappearing from our life is feathers. Everybody used to use feather pillows, feather mattresses and that and they brought them into the house. These things are a natural [sink 00:48:22] for L. plantarum. There's another one called Bacillus licheniformis. That's another feather degrader. L. plantarum is an antihistamine, right, so it's histamine-degrading. The Bacillus licheniformis is histamine-producing, but the licheniformis only grows on white feathers. The people who know this is the people who raise birds, like parrots and stuff like that. That's where you learn all this stuff, so you have this histamine-producing growing on white feathers. You have the antihistamine growing on all the feathers, the decomposing feathers. If you think about now, chicken factories, where they're raising chickens. What are all of those chickens? They're white, so we've bred this super-histamine-producing feathers.

- Dave: ... so it's not enough to pay attention to A1 and A2 casein. You have to know the color of the feathers of the chicken that made your eggs, or it's really not as bulletproof as it could be.
- Tim: It's just a nasty [inaudible 00:49:33], because we get these chickens, we pump them full of antibiotics, and they're raised so they have white feathers, and the reason they have white feathers is because when you pluck them, it leaves a nice clean carcass. If you pluck a black chicken, there's little black dots all over it. It doesn't look very appealing in the store, so you genetically breed all these chickens to be white. They're all producing histamines, so it's like the yin and yang thing is gone with the chicken farm. Then we pump them full of antibiotics, we eat the eggs, we eat the meat, and we've got all the crappy microbes from it. You get back to the heirloom breeds of chickens, like I raised ones called Black Jerseys.
- Dave: Nice.
- Tim: They're pure chickens. The old feather pillows, I remember when I was a kid, we had some feather mattresses out in this barn, and we'd play with them, throw the feathers around, and they were just nasty old duck feathers in there. They weren't white feathers. I bet if you buy a feather pillow today, it's probably full of white feathers that are sterilized and won't grow anything. Yeah, so you need to start selling those, good black feather pillows.
- Dave: Fermented feather pillows. I think there might be a few regulatory lines between here and there, but it's really ...
- Tim: [crosstalk 00:50:52] amazing on that, though.
- Dave: Raising BDNF is like a core biohack exercise does. It's certain kinds of movement, like yoga, blueberries, intermittent fasting. There's so many things you can do, and even going in and out of ketosis, you're changing the state. Anything that's causing hormetic change tends to raise BDNF, because it helps us adapt to new environments, high-intensity interval training. I did not know that about plantarum. I'm certainly familiar with it.

- Tim: L. plantarum BDNF. You'll find [inaudible 00:51:26] the whole thing.
- Dave: We'll put a link in the show to that Google query. I'll use, "Let me Google that for you. If you don't know that service, it's the best one ever."
- Richard: I love it when someone asks me a question.
- Dave: This has been an amazing conversation. I'm really glad that both you guys were able to come on here. I'm hoping you're planning to do some kind of a book on resistant starch coming up, right?
- Richard: It's well in the works. Grace and Tim and I, and it's basically a package right now, but because this is such a moving target, we've found in a lot of instances of having to go back and really adjust and re-write stuff, because there's new stuff coming out all the time. At a point, you got to say you cut, cut, and that's kind of where we're at right now. I think Grace and Tim are currently working on a re-write of a chapter about probiotics, I believe. I'm a chapter or two behind them and word-by-word-by-word edit, because it is quite long at this point. I don't know, Tim, 400, 450 pages, I think.
- Dave: That's a long book.
- Richard: That's long, and so I'm going through, and I'm trying to say everything that we can possibly say in as few words as possible.
- Dave: Don't do the Gary Taubes mistake. "Good Calories, Bad Calories" was a seminal amazing book. I couldn't put it down, but there aren't that many readers like the three of us that couldn't put it down, which is why he came out with, "Why We Get Fat and What To Do About It". Keep it accessible, because I'm struggling with the same thing with "The Bulletproof Diet". I want to write [inaudible 00:53:13] but I'm not.
- Richard: You can ask Tim what I go through, and he was looking at revisions yesterday. I'm trying to write it that it's like a narrative story about all these bugs in your gut. That was my original idea. Someone needs to tell their story, right, but then it's got tons and tons and tons and tons and tons of references. I don't know. We've got thousands of references. A lot of people don't even look at the references. Part of that word count is

thousands of references. I don't really know how it's going to shake out in the end with the length, but hopefully we'll know very soon, because we've got to wrap this up.

Dave: Do you have a publisher, or how's that all going to work?

Richard: Well, Mark Sisson kind of let the cat out of the bag. Remember when he was on your show? That was the first time he said it publicly that we'd been back and forth on this.

Dave: Okay, so that's official? We can talk about it?

Richard: Mark's attitude, and I agree with him, is that because I write about resistant starch and Tim does and Grace does and everything, within that community, it's cool to say we're working on a book and da-da-da-da-da, but it doesn't really serve Mark's interest if it turns out he officially publishes the book to make a big hey about it now. It's something you want to do a couple months before it comes out. That's when we'll hear Mark talking about it.

Dave: When the time comes for your book launch, let me know a little in advance. We'll get you back on this show so people can hear the latest about the book. I like to support my friends' launches as best as possible. The Bulletproof podcast is growing pretty well. Number one ranks most the time. If we can push more readers towards your book, I think it's going to be an important seminal work on nutrition. I'm eager to read it, and if I can read it early, please let me. I'll even say something nice if it's worth it.

Richard: I'll return the favor with you as well, Dave, when you say yours is due ... [inaudible 00:55:18] in December, you think?

Dave: My deadline is June 1st. Rodale is publishing it, and it should come out December 2nd.

Richard: Okay. Yeah, that's a ... That's a tough deadline.

Dave: You are the only podcast I'm recording this month, because this is such important stuff. I moved all the rest of them out until I hit this deadline.

All I'm doing is the on-stage appearances where I promised someone I'd be there and writing, because there's so much I want to say.

Richard: Tim and I just talked about that the other day. This is probably the last thing we're going to do until at least the book is off and into the publishing shoe. The thing is, when that happens, I'm going to be busy, too, because by that point, Tim and Grace will be done, and it will be my job to go to the excruciating process with the actual editors. That's going to be a nightmare.

Dave: I totally understand that. Let me know when it's time to have you back on. You guys are always welcome. Before I let you go, I know we're running up on the end of our deadline here, there's a question that I ask every guest ... Top three things for people who want to kick more ass. It doesn't have to be resistant starch-based, just your whole-life most important three things. Since I've got two of you, that means there's six. Richard, why don't you go first.

Richard: The top important three things is, number one, real food. Everybody knows what that is. Whatever your own particular dietary things are, whether you are more plant-based or whether you're more animal-based, just try to make it good and real food. The second thing is get outside and have fun, whether that's a walk or working out outside, whether it's laying in the sun or whatever, and number three is to get good sleep, but I like to say, it's kind of like what we were saying with dosage with resistant starch. I'm not one of these guys who say, "Oh, I've got to get my seven hours or eight hours every night. I prefer to be the kind of guy who has four hours one night and ten hours another night. In other words, if my body wants to sleep ten hours, I'm going to let it sleep ten hours, but if I wake up, and I've slept for four and I feel fine, rearing to go, then get up and get going, right?"

Dave: That's what healthy people do.

Richard: Get off the clock is what I'd say in terms of sleep. Sleep when you're tired. Get up when you're not.

Dave: Love it.

Richard: That's my three.

Dave: Tim, enlighten us with your tater tot knowledge.

Tim: I guess what I've been telling everybody lately is read all that you can about the gut. There's so much coming out on it every day. There's articles, there's blogs, everything. Read every one of those gut articles and YouTube videos. Watch those. Learn as much as you can about the gut. When you're reading it, listen to that. Keep in the back of your mind resistant starch, prebiotics and probiotics and how that changes what you're hearing about it. A lot of things you read and hear about the gut, it seems like it's really out of your control, but when you're feeding the gut and applying new microbes in there, things actually can be within your grasp, like changes, so read all you can about the gut.

Also, try to get in touch with the dirt, especially this summer. Go out and grow a garden. Dig in the dirt. Plant some new trees. Try to keep your hands dirty in the summer and don't go crazy about sterilizing them. There are so many microbes in the dirt. Most of the probiotics that we've talked about today are in the dirt. If you pick up a handful of dirt, you're going to get *L. plantarum* on your hand. The stuff lives in the dirt.

Also, I tell people biohack yourself. Biohack something. Try some new things and see how you feel. Don't just read the blog [inaudible 00:59:20] four tablespoons of potato starch. If it doesn't work, you quit it and call it a bad experiment. Biohack it. Try to figure out what's not working. Try to make it work for you, just like you're doing. You didn't stop with potato starch. You moved on to other things and you're finding things that work for you. That's what I like to tell people. Keep biohacking yourself, because you've got the rest of your life to get it right.

Dave: Love it. Guys, thanks for being on here. Let's see. Name some blogs real quick that people can go to, and then I know you got to run, Richard, specifically. freetheanimal.com, and any other places we should send people?

Richard: Oh, yeah. Paul Jaminet, "Perfect Health Diet".



- Dave: Oh, yeah.
- Richard: Good resource.
- Dave: Great guy.
- Richard: ... is one, and he's pretty, of course, supportive of starches and resistant starch. Robb Wolf has been talking about it, robbwolf.com. Chris Kresser has been talking about it and promoting his ... and Chris is in clinical practice and has had a lot of good results with his patients, which is important to understand. Then, of course, our collaborator, Grace Liu, that's bganimalpharm.blogspot.com if I'm not mistaken. That's where a lot of this action is on resistant starch. Oh, and then Mark Sisson.
- Dave: Of course.
- Richard: "Mark's Daily Apple". He finally came out and did a definitive guide. When Mark Sisson does a definitive guide, that means he has been convinced that there is something big and important about this. There's not tons of definitive guides. It has to be something that he considers real worthy to do that.
- Dave: Lovely. Thanks again, guys. I look forward to hearing about your book when it comes out.
- Richard: Thank you, Dave.
- Dave: Hey, if you haven't heard yet, we've got activated charcoal back in stock.

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Quick Guide to Key Points

- How to Raise BDNF: blueberries, Intermittent Fasting, exercise, yoga, going in and out of ketosis, and high intensity interval training
- When the starch is not cooked they “resist” digestion and reach the large intestine. Resistant Starch Types: RS1 (nuts and grains preserved by a shell), RS2 (green bananas and potato starch), RS3 (when RS2 is cooked it expands and when cooled will resist digestion), RS4 (man-made)