

Dave Asprey:

If you're a regular listener, you've heard me share my list of top 10 bio hacks. Let's talk about number nine, fun hacks for the bullet proof mind. It may sound weird, but hanging upside down is a great way to hack your brain. Regularly inverting trains your brain capillaries, making them stronger and more capable to bring oxygen to your brain.

It's pretty straightforward, more oxygen in the brain means better performance. I get my daily stretch and my dose of oxygen with my Teeter Inversion Table, which is so essential for optimum focus, concentration, and mental energy. That full body stretch elongates the spine and takes the pressure off the disks so they can plump back up. Less pressure means less pain. If you have back pain, even if you've been lucky enough to avoid it so far, you really want a teeter to invert every day to keep your back and joints feeling great.

For over 35 years, Teeter has set the standard for quality inversion equipment you can trust. My friends over at Teeter have decided to show some love to Bulletproof listeners. For a limited time, you can get the Teeter Inversion Table with bonus accessories and a free pair of gravity boots, so you can invert at home, or take the boots with you to the gym. To get this deal, which is a savings of over 138 bucks, go to [getteeter.com/bulletproof](http://getteeter.com/bulletproof). You'll also get free shipping, and a 60 day money back guarantee, and free returns. There's absolutely no risk for you to try it out.

Remember, you can only get the Teeter with bonus accessories and a free pair of gravity boots by going to [getteeter.com/bulletproof](http://getteeter.com/bulletproof). [Getteeter.com/bulletproof](http://getteeter.com/bulletproof). Check it out.

Speaker 2:

Bulletproof Radio, a state of high performance.

Dave Asprey:

You are listening to Bulletproof radio with Dave Asprey. Today's cool fact of the day is that sweating does more than just cool you off. In 2012, a review of 50 studies on sweating found that sweating removes lead, cadmium, arsenic, mercury, especially in people who have heavy metal toxicity, like I used to have. I had high levels of mercury and moderately high levels of lead that were affecting me. Sweating also eliminates BPA, which is a hormone disrupter found in plastics, and that stuff accumulates in your fat cells.

If you do something like the rapid fat loss protocol, the Bulletproof Diet, or even go on a crash starvation diet, a low calorie, low fat thing, if you dump a lot of fat all at once, all of those toxins come into the body. You're going to want to sweat more if you're losing more weight. What you want to do is, you want to sweat. Saunas are good, exercise is good. Pretty much anything that makes you sweat can be good for detoxing, it's a way to bio hack your way to feeling better, performing better, just when you eliminate waste.

Speaking of eliminating waste, before we get into the show, if you haven't had a chance to try out the brand new glutathione force, it's worth your time. If you're a long time listener, you know that glutathione is one of the primary detoxing antioxidants in the body, it's used up precipitously in the liver, but it's present in most cells in your body. It's also highly represented in your brain. When you run out of glutathione in the liver, you start getting liver damage, which is why alcohol, and Tylenol, things like that, can cause damage to the liver.

Taking exogenous glutathione is a way to just increase your body's detox abilities, and that's why I've been using it for many years. I have used it intravenously, and that's why I started making an oral form that was absorbed. You just have to put it under your tongue, didn't taste so good, but it worked really well. We recently, after a lot of research, came out with an encapsulated version of true liposomes that you can take orally. They transport well with you, and they actually absorb. The problem with glutathione has always been getting it to go in without being digested. We've got a way around that, and the new glutathione force is easy to travel with, it's just capsules, and it's totally made it a lot easier, and the TSA doesn't look at you funny for carrying syringes of strangely colored goop like they used to. This is a big upgrade, and it doesn't taste like orange frosting anymore. Check it out on [bulletproof.com](http://bulletproof.com).

As we're getting going, you're probably still on the iTunes webpage. Do me a favor really quick and leave a five star review. I'm grateful for that, it's a way you can support the show, and tell other people that the show is good. We just crossed 1500 five star reviews, so I'm grateful if you take literally five seconds to do that. It makes more difference than you might imagine.

Today's guest has almost a half a decade working in functional medicine. In fact, he was working in functional medicine before even was named functional medicine. In fact, I think before, it was even called ortho-molecular medicine, and he's one of the world's leading authorities on science based natural medicine, has written a dozen books on it, hundreds of papers. He was named in 2003, the American Holistic Medical Association's top 25 pioneers in holistic medicine. The founding president of Seattle's Bastyr University, President Clinton, in 2000, appointed him to the White House Commission on Complimentary and Alternative Medicine Policy.

I mentioned he's an author, he's also a best selling author, and he has a brand new book that you're totally gonna want to check out called the Toxin Solution, How Hidden Poisons in Air, Water, Food, and Products We Use are Destroying Our Health, and What You Can Do To Fix It.

We're gonna talk about toxins today, which is a big differentiator for just the way of thinking about taking control of your health. Maybe if you do less of things that make you weak, you'll be stronger. The guy who's been doing this actually longer than I've been alive is none other than Dr. Joseph Pizzorno. Dr. Pizzorno, welcome to the show.

Joseph Pizzorno: Well, thank you for the kind introduction.

Dave Asprey: What made you write, this is your 13th book, or is this your 12th book?

Joseph Pizzorno: Okay, so actually, I'm working on number 12, this is number 11.

Dave Asprey: It's only number 11, jeez, I over sold you, sorry man.

Working on 12, this is number 11, so what made you write this book, given that you have a pretty strong set of books, including some leading books in the field, already, what's new in the toxin world?

Joseph Pizzorno: I have been involved in medicine now for about half a century, first as a researcher in conventional medicine, then as a student of naturopathic medicine, then as a clinician, then founded Bastyr University, and then writing books, and lecturing literally all over the world. I've had a chance to see what makes people sick and how to help them become healthier.

Starting a half century ago, the primary reasons people were having chronic disease was typically nutritional deficiencies or nutritional excesses. But, then something started to change, and more and more I was noticing I was seeing patients who were being toxic rather than just nutritional deficient. I'll be very clear, I'm not saying nutritional deficiencies and excesses haven't gone away, we've simply add a bigger problem.

I was starting to see more and more patients showing signs of [inaudible 00:06:45] toxicity, and chemical toxicity, and intestinal toxicity. I started realizing that they weren't responding as well to nutritional therapy like they used to, and I had to detoxify their bodies. I said, "Okay, well that's interesting," and it really got triggered for me back in 1980 when a young man came to see me, he was 30 years old, and he had leukemia. Leukemia's not real common then, but kind of an unfortunate condition, and so I talked to him, and asked what he was doing, and he said, "Well, I work as a farmer over in Eastern Washington." "Well, that's interesting, tell me what you're being exposed to in terms of chemicals," and he told me, and I said, "Okay, fine," so I gave him some advice on how to not get cancer again.

Two weeks later, another young man, 30 years old, of course, seems young now, but at that time he was around my age. 30 years old, and he had leukemia, and he worked on a farm, and I said, "Well, that's interesting." I asked him, "What chemicals are you exposed to," and they were the same chemicals. At that time, I went to University of Washington School of Medicine book store, and I bought the most current book on toxicology, and I started looking chemicals [he'd been 00:07:57] exposed to, and lo and behold, these chemicals induce cancer. But, what's interesting, the toxicology book said, only induces toxicity and cancer in people who have high exposure like farmers, it doesn't affect anybody else.

I thought, "Okay, well, maybe that's true, because everybody else has lower dosage," but then you start looking at it. We're not just being exposed to one or two pesticides and herbicides, we're being exposed to a lot of these things, and now people are being exposed their whole lives, so I thought, "Well, that's interesting." Then, I started looking at the research on toxins and disease, and I was just stunned by what I found. Now, I'm making the assertion that the primary cause of chronic disease today in the western world is the toxins we're exposed to.

The wonders of civilization, as much as I love hot showers, and having all these computers, and things like this, there is a price we've been paying, and we have to become more aware of that price, and realize that, indeed, we can avoid many of these toxins, we can help our body get the toxins out, and we can get the toxins out, and become healthier.

Dave Asprey: There's a class of people, and I might have been one years ago when I was a raw vegan, where the mindset is, "Look, I want to get all my nutrients from mother nature." What I found just in my own course of losing 100 pounds and getting my brain back is that, you should only be exposed to mother nature's toxins, if you want to only get nutrients from mother nature. We don't live in that world anymore. It sounds like you really came across this 35 years ago, and you've been in clinical practice for a good portion of that 35 years, working with toxins, or is it more research, what's the breakdown?

Joseph Pizzorno: I do both. Before I started Bastyr, I was doing full time primary care. I saw a lot of patients then, but after I started Bastyr, I couldn't do primary care anymore, but having said that, what I end up doing is more concierge kind of care. I would see maybe a dozen patients a year, and I would only see the really, really sick ones, the really difficult ones, and typically people with lots of money, which is advantageous, because then I could run all the lab tests that I wanted to on them.

I got to see a number of people, but also, I got involved in some very interesting corporate wellness programs, and probably the most important was one I did in Alberta, Canada, where I was [inaudible 00:10:22] by one of the wealthiest men in Canada to help improve the health of his oil field workers. I said, "Well, great, this is interesting," so I said, "I have some ideas to how to improve their health, but I want to do it objectively, which means I need good data, so I want to run lab tests on them," so he says, "Okay," I said, "I want to test their nutritional status, I want to test their toxic status, want to test how their metabolism's working," and I asked him, "How much can I spend," and he said, "Blank check," [inaudible 00:10:48] blank check, right?

We researchers, [inaudible 00:10:53] dreams.

Dave Asprey: We need it.

Joseph Pizzorno: I then started telling him, what tests I wanted to run, and he said, "Well, if you can convince me I should run the test, I'll run it," so I ran \$1500 lab test on 4500 oilfield workers. I got a huge amount of data, and I started looking at the research, and looking at lots of toxicity, lots of indication of toxicity, and I started looking at, well, how do you get the toxins out of people, and we started getting toxins out of people, and their health started to improve, and, boy, it really got me deeply into it.

Dave Asprey: That wasn't Brett Wilson, or maybe you can't say, he's on Dragon's Den, but Brett and I have become friends. That sounds like something he would do, he's a Canadian oil billionaire, who's just conscientious about things like that. Maybe it's just part of being in Canada, that's just the mindset here. That blows my mind, \$1500 times 4500 people for corporate wellness, that is above the par.

Oilfield workers get exposed to all sorts of nasty organic solids, not just raw petroleum. What kind of stuff did you find in these people? I'm so just dying to know.

Joseph Pizzorno: Great question, because I actually use this in my lecture to students, and I lecture on this now all over the world. Everybody, of course, immediately things, "Oh, oil field workers, a lot of chemical exposure from working the oil fields." No. By the way, we had office people, not just oil field workers. These are basically guys, typically guys, they get in the pickup truck in the morning, have a cowboy breakfast. A cowboy breakfast is a cup of coffee, a pee, and a look around. One of these funny things from the Canadians.

They get in their pickup truck, they drive out to the prairie, they check out the pump, they make sure it's functioning properly, and then they do that, and they go home. Basically, they're rarely exposed to chemicals.

Dave Asprey: Oh, wow, so, then it's lack of exercise, or what did you find?

Joseph Pizzorno: [crosstalk 00:12:46]?

So, why all the toxicity?

Dave Asprey: Yeah.

Joseph Pizzorno: They drink, but they don't drink a lot more than anybody else does. We start talking to these guys and realize that many of them are doing two things that are very problematic for them. One is, they fish in the lakes in Canada that have been poisoned with lots of metal toxins from industry, and second, they work in the oil fields to subsidize the family farms. They have family farms that have been in the family for generations. They, because they're aggro business, now, they can't quite compete, so they need a little extra income, and so they get the income from working the oil fields.

What are they doing on those family farms? Herbicides, pesticides, all these things they're doing that are then exposing them, showing signs in their blood test, of toxicity, and who is eating the foods that they're making, they're preparing? That's us.

Dave Asprey:

Wow. That's shocking. The data there, even going back a few years, is that small farms, 90% of them are not self sustaining, you have to have a job. I'm a small farmer, I live on 32 acres on Vancouver Island. The goal was to grow all of our own food. I can tell you, there's nothing sprayed ever on this property, and certainly we don't spray anything other than natural stuff. There's no way it pays for itself. Even if my whole family worked 12 hours a day, it would not pay our cost of living or anything. You have to do that, especially organic.

What you're finding is, the oil industry wasn't responsible, at least, maybe the oil industry runoff, and pollution into the fish, that was where the metals were coming from, and then the [endocrine 00:14:31] disruptors were coming from what they sprayed on their fields?

Joseph Pizzorno:

Correct. As you know, you mentioned glutathione, which I'm delinted to hear your interest in it, I think it's a fascinating area, I've lectured on that as well. One of the tests I ran on these people, was the test call GGT. GGT, Gamma Glutamyl Transferase, is a standard liver enzyme that's measured to see if a person has hepatitis. When their livers are damaged, that enzyme gets really high, and it's a way to try to recognize who has hepatitis, and figure out why.

It turns out, as you may know, within the normal range, which is 10 to 60, GGT goes up in proportion to chemical and metal exposure for 90% of population-

Dave Asprey:

By the way, water damaged buildings, toxic mold, will also raise GGT, because the toxins there from mother nature will also damage your liver, right? Any toxin could do it.

Joseph Pizzorno:

[crosstalk 00:15:24].

Actually, if you look at research, looking at the VLCs being released by the molds, and then look at the effects of chemical toxins in the body, it's almost identical. [crosstalk 00:15:34]. The thing with GGT is that, for 90% of population, it goes up in proportion to toxic load. The reason for that is that GGT is the enzyme that recycles glutathione. Our smart bodies, when we're exposed to toxins, say, "Ah, I need more glutathione than I can produce from the [inaudible 00:15:49] that's available in the diet," so now we recycle the glutathione that's available to help ... protects us from the oxidative damage, and help get the toxins out of the body. It turns out to be very important.

10% of people, unfortunately, however, don't have the genetics to help regulate GGT, and my assessment is they're the ones who are actually most damaged by the toxins.

Dave Asprey: Okay, how do people listening know if they're on of the 10%? That's a huge thing to understand. I'm guessing I might be, given my terrible health history from toxin exposures, but I'm healthy now because I monitor that stuff. But, how do I tell?

Joseph Pizzorno: Right, so it turns out 23andMe will do a genetic test for just \$200. The problem with that is you get hundreds of thousands of snips, and what do they mean? Actually, I've been working with my team to create an artificial intelligence program, which I think you'll appreciate based on your background, that actually will go to 23andMe, download the results of the snips, and then determine what enzymes the body are not working properly.

We just finished last week, 250 snips. We've been working on for the last year, and we now have 250 snips into the system, so now we can determine which people are going to be most toxic susceptible.

Dave Asprey: Are these different from the MTFHR and the CBS [crosstalk 00:17:02]?

Joseph Pizzorno: Yes, yes, exactly.

Dave Asprey: Those are the same, or they're different?

Joseph Pizzorno: No, different, definitely different.

Dave Asprey: Okay. For listeners who've heard some past episodes, a lot of people, including me, I have some problems with my methylation, and a good percentage of population has at least some genes that are off there. I have a problem with my sulfur metabolism as well, one of my CBS enzymes is off, so I changed myself on the regimen It's one of the reasons I don't tell everyone, "Here's all this stuff I take," like, don't copy me, I'm genetically unique, and so are you. Do what matches your biology. Don't copy me or any other person on their supplement regimen, it has to be custom.

Joseph Pizzorno: Correct.

Dave Asprey: Can people already get this test? I want to do your test, is it available?

Joseph Pizzorno: Yes, so if you go to [thetoxinsolution.com](http://thetoxinsolution.com), we are making access to this test. I don't think it's on that website quite yet, but it's going to be there shortly, as kind of a promo for people pre-ordering, we actually give them access to this test.

Dave Asprey: This is super cool, because 23andMe is hamstrung. There's a lot of really good data, and for all listeners, you should have this level of data. I actually have my full genome sequenced, which is unusual, and not necessary for most people, but if you have this data, it's 200 bucks, you'll figure out that you actually have weird stuff, like, I'm something like 0.1% some nomadic Siberian tribe, which is

just interesting, and potentially 0.1% Native American, too, they're not really sure.

Okay, that's just cool, they can tell you that, because it's not FDA regulated, but all of the good stuff in the data, the FDA hamstrung them and says they can't tell you. But, Dr. Pizzorno, your work, you're allowed to say whatever you want on someone else's data, so we have this weird separation that's done for legal and regulatory reasons. I would say, everyone here, order your 23andMe, so you have the data, and then run it through so you know if you have methylation problems. Do you also do that, or they can get that on any other website?

Joseph Pizzorno: So, methylation problems have been well worked out, and there are a number of sites you can get that from. We're working at the detox enzymes, and all the other things, so this is a level of evaluation, I'm not aware of anybody else having done.

Dave Asprey: Okay. Would you tell people to go to a different website for methylation, as well, or do you just cover that because it's already there?

Joseph Pizzorno: Oh, sure.

Dave Asprey: Okay. What's your favorite?

Joseph Pizzorno: We have methylation in there.

Dave Asprey: Oh, yours is in there as well? Okay.

Joseph Pizzorno: [crosstalk 00:19:08].

Yeah, PureGenomics does a good job with the MTHFR polymorphisms.

Dave Asprey: PureGenomics testing, okay, cool, so that's a second test, and I think that's probably free. I know Genetic Genie's one I've used, it's free, or you donate five bucks, or something.

You owe this to yourself. In the show notes, I will tell all of you these links. It doesn't take a long time to do this, you spit in a thing, if you don't already have your results, you give your access to your account to the right app, and all of a sudden you know your weaknesses. Imagine, if you're Superman, and you don't know you're allergic to kryptonite, and then, Lois Lane gets a ring with kryptonite on it, and sometimes you feel like crap, and sometimes you don't, and you just have no idea why. You just think, "Maybe it's because I didn't try hard enough."

This is the story of my life. I'm working really hard and it's not working, it's because of this. The knowledge that you're offering is precious. I didn't realize



you were doing that from looking through your work, because it's not on the website yet, so thank you for offering that. I'm actually really excited about this.

Joseph Pizzorno: You might find this interesting, actually be fun to have a cup of healthy coffee with you someday. I've been working for 15 years to develop an artificial intelligence system that maps the human body.

Dave Asprey: Oh, cool.

Joseph Pizzorno: I've created a ... the technical term is, annotated [inaudible 00:20:24] inference network, where we have done brute force access to the research, to basically map physiology, and then use information about the user to determine where their physiology's not working properly, why it's not working properly, what to do about it. So, laboriously went through all these, past couple decades, as illustrated your book, we're gonna make that easier for people.

Dave Asprey: There's no reason it should've cost me a half a million, actually more than that now, and all of this incredible work, and it's because no one had put the data together. It's funny, we will sit down for that cup of coffee, you're still in Seattle, and I'm in Victoria, so it's close. Also, my undergraduate degree is in a subset of artificial intelligence, called decisions of [inaudible 00:21:11] systems. They actually told us, don't call it artificial intelligence, because no one's ever gonna believe it's real. It's actually real now, and I'm really excited that you're using the huge amount of data that you have, even 4500 people from one company, where you know about their lifestyle, it was unusable 10 years ago. We just didn't have the data processing, and the machine learning, and now we do, so I am super excited to hear about this, because we are on the cusp of unraveling mysteries that haven't been out there.

Let's go back to these environmental pollutants, these toxins. One of the things that makes me ... There's two things that make me really concerned, and kind of upset. One of them is a dosage response curve, and for listeners, we, as humans, we have this bias, we think, "Okay, if some of it's good or bad, more of it's good, and less of it is bad," we just imagine a straight line that goes up and to the right. In your experience with toxins, what is the dose response curve look like?

Joseph Pizzorno: Very good observation. I think one of the reasons why the researchers did not earlier realize the huge problem with these toxins was that we've all assumed you'd have linear dose response curves, which means the more the toxin, the more the damage. Unfortunately, many of them [curve or 00:22:37] linear ones, where a small amount cause a lot of damage, medium amount, not much damage, and a higher amount cause a lot of damage. One of the ways that researchers tried to determine how problematic a toxin is, they look at what happens to animals at low dosages, what happens in medium dose, what happens at high dosages. If it doesn't look like there's a lot of difference

between them, particularly the low dose and high dose, the figure, "Well, [inaudible 00:22:59] not a big problem."

Unfortunately, what's happening, is these things have surprisingly significant effects at low dosages, but the even bigger problem is that so much of that research was done on single toxins at a time.

Dave Asprey: Yes. That was my second question for you, you read my mind, keep going.

Joseph Pizzorno: Oh, yes.

As I tell my students ... It just so happens, just taught my last class this morning at Bastyr University, a class I've been teaching students now for 40 years called healing systems.

Dave Asprey: Love the name.

Joseph Pizzorno: In healing systems I talk to the students about, you've got to get all the parts of their body working the way they're supposed to. Anyways, as I'd said to them, when we look at toxicity, yes, the specific toxic effects are very, very important, but you have to look at total toxic load, because when you look at total toxic load, now you get very clear linear effects. The more toxins you got, the more damage it does to the body.

A big reason that happens, is because glutathione plays such a critical role in both protecting us from the oxidative stress from the toxins, but also for getting them out. Mercury, and all these [inaudible 00:24:07] organic pollutants, and such, the phase two conjugation with glutathione, I know it's kinda technical, but it requires glutathione. The more toxins you get, basically you start depleting your glutathione, and as you deplete glutathione, you now can't protect your DNA from oxidative damage, but even more critical, you can't protect your mitochondria from oxidative damage. You get older faster, you get sicker faster, and you get more cancer faster.

Dave Asprey: That's why I just finished writing Head Strong, which is all about how do you protect and up regulate mitochondrial function, and mitochondrial density, because stuff, whether it's the metals, the toxins, poor diet, stress, bad light, all that stuff affects it. I don't want to age, I want to live to 180. That's my goal.

By the way, is that a good goal? Is it possible for a 45 year old to hit 180, do you think, or am I nuts?

Joseph Pizzorno: My best assessment is, not with our current technology.

Dave Asprey: Agreed.

Joseph Pizzorno: I think human beings, our top end is going to be around 120. If you do everything right, the best you can do is 120. Having said that, though, I think there are some technologies evolving that will help us start repairing some of the damaged DNA, and extend that along. But, until we can actually better repair the damaged DNA, I think we've got a time limit here.

Dave Asprey: We're in full agreement, I think 120, currently, is reasonable, I'm just betting that something cool will happen over the next 80 years, because when I go back 80 years, things were pretty different.

Joseph Pizzorno: Yes, yes, I hope so, as well. Also, I have the great fortune of being from a relatively long lived family. I knew my great grandfather. My great grandfather lived to age 95, never saw a doctor in his life, had no apparent disease, no limitations. I used to, as a precocious youngster, I used to play strategy card games with him, and he'd beat me all the time. I'm thinking, "There's my great grandfather, he's doing everything ..." He lived, basically, the mediterranean type lifestyle, but what I've called a healthy mediterranean type lifestyle, with low toxic exposure. He did incredibly well.

Then, I looked at what happened in my grandfather, and my father, and as it went from a mediterranean lifestyle of healthy foods and low toxins, to a more, and more of the North American type diet and lifestyle, you can see them start to degenerate, start developing disease, and start developing dementia, and all these other things. I want to be like my great grandfather. I want to have a healthy, full life, and not much disease.

Dave Asprey: The big differentiator there, when I say things, and I'm not the only one talking about living beyond what people think is possible right now, but I'm one of the further out number of people in the public eye. Everyone says, "Well, why would you want to look like a turtle and be in a wheelchair for 60 years?" That's not what I'm [crosstalk 00:26:54].

Joseph Pizzorno: Exactly.

Dave Asprey: I want to look like this when I'm 180, I don't know if I can do that, but I hope with technology, and avoiding the toxins that you right about in the Toxin Solution, that there's hope, anyway.

Joseph Pizzorno: Yes, yes.

Dave Asprey: You talked about this dose response curve, and how toxins, at very low doses, can have just terrible effects, and then bad effects at high doses, but since it's not a straight line, researchers just kinda throw it out as saying it doesn't really matter. There's also this issue that safe levels of one toxin will not be safe when present with another one, and you simplify that as total toxin load. That's something that I learned about because, as I was unraveling my own problems, I

certainly had the mercury and lead problem. I also had lime exposure, which makes natural toxins, and a lot of the toxin mold exposure.

I am allergic to eight of the top 10 toxic molds, which means I've not only been exposed, I have an allergic response to them, which is proof of exposure. When I dug into the literature, both on the chemical side that you write about, and on the natural, nature made toxin side, safe levels of one micro toxin, when you put them with safe levels of another micro toxin, equals way unsafe. No government on earth has multi-micro toxin standards, and that's why I did it for the Bulletproof Coffee, there's really probably about six or seven that are really important in coffee, but we test for 25 that can occur, and some of them have no government regulation at all, other ones are single toxin levels.

I'm genuinely concerned, because when you take mother nature's toxins, which come from eating processed food that's been stored for a long time, in fact, in corn, the toxins, we spray it with glyphosate, we spray it with all these other things, and one of those things, in fact I believe it's glyphosate, causes [fusarium 00:28:48], the toxic mold, to go into the root stock. You can have pristine looking corn that's been contaminated by its roots, because the mold now lives in the roots because of the chemicals we use. Now, you're getting mother nature toxins stacked with man made toxins, on something that looks like it's a pristine ear of corn.

I feel the symptoms you write about in your book, things like tremors, dizziness, I don't get elevated blood pressure, I get low blood pressure, which is the opposite side of that, insomnia, for sure, fatigue, and just brain fog. If I eat a meal, I feel this, probably because of mitochondria damage. What about people who don't really feel those too much? Should they worry about this?

Joseph Pizzorno: Ah. You covered a lot of great territory there.

Dave Asprey: A lot of questions, sorry.

Joseph Pizzorno: Let me start with the ... I think a very important factor, I taught my students, last week, actually, is humans have about 1000 fold variation in the activity of each of their detox enzymes. That's very significant. Significant not just when they're low, but sometimes it can be a problem when they're really active. [inaudible 00:29:56] you have in your liver, kind of a two stage process for getting rid of toxins. We have what's called phase one, that both directly detoxifies many of these things, but typically, for the really tough ones, it converts them into what's called an activated intermediate, which, then, phase two, binds to another molecule called conjugation, to then neutralize it, make it water soluble, get it out through the kidneys.

That intermediate, that activated intermediate, is far more toxic than the chemical that was been activated by phase one. If you've got a high phase one, and a low phase two, you're actually making yourself worse because of that liver

enzyme working better. Normally, you want your liver enzymes all working really well, but genetically, we have these polymorphisms, and they vary quite a lot. It turns out, that indeed, you have situations where, for example, you're exposed to one toxin, and you're producing all this active intermediate, it's now using up all the glutathione available in phase two for neutralization, and then you expose yourself to another toxin that needs phase two glutathione to neutralize it, and now you can't neutralize it, because you've used up all your glutathione.

There are tons, and tons of examples of how multiple toxins make you far worse, far more toxic, and far more damaged, than the just single ones at a time. Another factor that's really important, is we start looking at the clinical research on toxicity. Up until about the age of 40 to 45, you don't see a lot of effects with toxins except for people who are particularly susceptible. But then, once you hit the age of about 40, 45, if you've not been taking care of yourself, if you'd been building up toxic load, if you've damaged your DNA, then, frankly, all hell breaks loose. Then, all this chronic disease starts happening where people say, "Oh, I was fine, but then I was age 50 and I got diabetes, I got heart disease," or, "Oh, god, just so unlucky, I got cancer."

Well, no. You just spent your whole life setting yourself up for it. When you're young, you get away with everything, as you get older, no, you cannot get away with it, but now you're starting to pay the price for not taking care of yourself.

Dave Asprey: During the course of research for Head Strong, I looked at mitochondrial function, and I know that my mitochondrial function, at least, it's much better now after all the repair stuff I've done, but it was pretty bad, which is why I was getting brain fog, you have a lot of mitochondria in the brain. I came across some work that said about 48% of people under age 40 have early onset mitochondrial dysfunction today, and pretty much everyone over age 40, it's called aging.

Joseph Pizzorno: Yes.

Dave Asprey: I believe that the increase in that early onset mitochondrial dysfunction is directly correlated to toxin load, just like in your book, and I don't care where the toxins come from, whether we made them, or mother nature made them, or they're made by the bacteria in your gut, they're all toxins, they all affect mitochondria one way or another. Some of them affect higher level organ systems, but when you keep digging, you always find, at the end of the day, it hit the mitochondria.

If 48% of people are getting this early onset, some of them are going to feel tremors, dizziness, these other symptoms, and I guess those are the ones who should worry the most. I get maybe 5% of people, I can take every mitochondrial enhancer that you make, I can drink pizza smoothies, beer, ice

cream, stay up all night, it doesn't matter. These are walking supermen, as far as I can tell, I want their mitochondria.

Joseph Pizzorno: Right, pick a different mother here.

Dave Asprey: Exactly. I actually believe that I might be one of the first people to get a mitochondrial transplant, I don't see why you shouldn't have mitochondria from three different people into me, that'd be really cool for redundancy.

Joseph Pizzorno: That might be one of those technologies that will increase our actual human longevity.

Dave Asprey: I hope so.

Joseph Pizzorno: Because, you're right. Once the mitochondria are done, you're done.

Dave Asprey: Just having a mix of them, I come from a background of making highly fault tolerant computer systems, so when the different components don't break for the same reason, then, "Great, somebody took out half my mitochondria, but the other half are still partying, which gives me a chance to replace the other ones." I'm super hopeful that's one of the 5000 avenues of anti-aging that might save both of our lives.

Joseph Pizzorno: You may know this data, but not a single audience I've spoken to has been able to answer this question correctly. How much ATP do you produce every day at rest?

Dave Asprey: The at rest might make it tough. My research says that the 50 or 60 grams we normally have get recycled to about 600 pounds of ATP on a daily basis.

Joseph Pizzorno: You're the first person to answer that correctly.

Dave Asprey: Oh, wow, cool.

Joseph Pizzorno: My data's a little different, but you're the closest of anybody so far. It turns out that we basically produce our body weight in ATP every day at rest. Now, if you go out and sprint, run away from that sabretooth tiger's trying to eat you, we produce a half a pound of ATP every minute, to give people an idea of how much ... Our mitochondria, we don't store ATP, your ATP goes away, you're dead, pure and simple, right away, because we don't store any ATP in our bodies.

You think about the incredible metabolic activity necessary in the mitochondria to produce all that ATP every day, and of course, we're not just sitting down, we're moving around and being active, then indeed, we require hundreds of pounds of ATP every day. That helps explain why the mitochondria are so susceptible to environmental toxins and nutritional deficiencies.

I'm an avid basketball player, so I've been playing basketball at the same place and time, the same game, for over 30 years now. Everybody in the age group below me are now gone [crosstalk 00:35:52]...

Dave Asprey: [crosstalk 00:35:52] about 70, I'm guessing?

Joseph Pizzorno: Yeah, you got it right. I was born in 1947. I play with guys half my age. What I've noticed, is that when guys hit about the age of 50, they all disappear, because what's happened is, well, after you play ... Do you play basketball yourself?

Dave Asprey: Ah, too tall.

Joseph Pizzorno: Okay, too tall.

Dave Asprey: I have a screw in my knee, so I watch basketball, I don't play it.

Joseph Pizzorno: I am on the more shorter side, well, average height, I guess. I love the game nonetheless. Anyway, when playing with these guys, after you play a couple hours of full court basketball ... Of course, you want to do it on a wood court, because you do it on asphalt you destroy your joints, but you're really sore afterwards, so what are these guys doing? Well, they're popping their ibuprofen, and [inaudible 00:36:41] anti-inflammatory drugs, and things like that, which take away the pain, but they do two things, which is critically important. Number one is, they actually impair cartilage regeneration in the knees, and they poison the mitochondria.

Dave Asprey: Yes.

Joseph Pizzorno: What's happening is they burn out their bodies more quickly. It's interesting, I look at these guys, I love playing with them, and I know that they're only gonna be there for 10 or 20 years, because after that they've wrecked their bodies and they're done.

Dave Asprey: Because you understand human systems, the course that you teach, you don't make those not obvious decisions. Feeling good the next day seems to make sense, and there are natural things like turmeric, you might consider, that don't cause mitochondrial damage that also help with swelling and allow your body to still heal.

Joseph Pizzorno: It'd be fun to sit down and compare notes, because I've been pretty aggressive about taking care of my mitochondria for a very long period of time now. I've a pretty good idea of what it takes for the mitochondria to function properly, and what damages it more quickly. These things are largely under our control.

Dave Asprey: I am absolutely fascinated. I'll get you a copy of Head Strong, and then what we'll do is we'll sit down for lunch in Seattle, the Bulletproof headquarters is in Bellevue, so it's easy for me to come down there. Maybe we'll record our

conversation and make it a bonus thing here for your book, or for the podcast, and we'll just talk about, how do you hack your mitochondria, because not a lot of people are doing it, especially, because you've been doing it for longer than I have, and you're further along in life, and the difference is like ... You look at mitochondria, they're 10% of your body weight, maybe, and you think about your iPhone, which is a good thing for listeners. If the battery discharges faster, your phone stops working halfway through the day. If you can do something to make the battery last longer, your phone works better and you get more out of it.

If you look at the mitochondria in you, 10% of you is your battery, you put a toxin in there, the battery won't take a charge. A third of the capacity is gone. You charge it, and it doesn't work. How do you charge a mitochondria? You eat.

Joseph Pizzorno: May I use that analogy in one of my lectures? That's a great analogy.

Dave Asprey: Please, use anything in your lectures. The whole point is to get this knowledge out there. If only someone had told me this when I was 20, and I understood that what I was doing was harming my mitochondria, especially as I got fatter, which is a mitochondrial dysfunction, and as I got more, and more brain fog, and to the point where ... I was to the point where I wouldn't have hired myself, even though I had a high powered Silicon Valley job, and made all kinds of money that I then lost. I was barely hanging on, and I was generally fearful for my ability to care for myself.

I know so many other people who get there. I get celebrities now, musicians, and famous actors, and all, who are there, because they're living a highly toxic lifestyle with skin care products painted on them on sets full of formaldehyde, and it's hitting them. We talk about that stuff privately, and they're scared because not only do they have to feel good, they have to look good. For me, I'm only a 300 pound computer hacker, all I have to do is be able to think.

I'm genuinely interested in your program, and we'll see if there's any upgrades to the recommendations here. What would you offer for people listening, who now they know, because of what we just talked about, they're getting these pollutants, even if they eat mostly organic, which is a good choice, they're still getting some because they breathe, and because they shower and things. Top three mitochondrial enhancing, or just detox enhancing things, what should you do right now if you're listening going, "Oh, my god, I thought this was all BS, this guy's credible, it's not BS, what do I do?"

Joseph Pizzorno: Before I answer that, let me go back, and something you mentioned earlier. First one, let's have that lunch, talk about mitochondria, and let's record it.

Dave Asprey: We will.



Joseph Pizzorno: When you started the program you mentioned how sweating gets rid of toxins. I assume you've been reading the work of Steven [Genuis 00:40:41] up in Edmonton, Alberta.

Dave Asprey: That name isn't familiar, I read a lot of papers, though, so do tell me.

Joseph Pizzorno: He's the guy who got people sweating, and then he took their sweat and measured what was in it, and he also compared what was in their sweat to what was in their blood, what was in their urine. A couple years ago I had a chance to meet him. We ate at an organic vegetarian restaurant, and I'm not exaggerating, we sat down, started talking, when I next looked up it was two hours later. I wish I'd have taped that conversation, because it was just fascinating, because he came from the ... as a clinician, as a researcher, his perspectives, and I came as a clinician, researcher, with my perspectives, and it was fun to see where we agree, where we didn't agree, how we could learn from each other. It was so much fun, so let's record it.

Dave Asprey: Okay, we'll definitely record it, and at a minimum we'll do a transcript, sometimes the sound quality is no good for a podcast. This is the sort of stuff, that's why I do Bulletproof Radio, is to get a chance to talk with guys like you, because you've got a wealth of experience out there, and we have this unfortunate habit of, we only are willing to look at double blind clinical trial data, but the real knowledge, and the stuff that you're mining in your AI stuff, it comes from clinical experience, and looking at what works, and noticing things that shouldn't be, and asking, "Why?"

We have these, I call them science trolls. There's people out there that say, "Well, I don't like that, therefore it's not true, therefore here's a study that I Googled in five minutes on PubMed that disagrees, therefore, you're a con artist." It's completely illogical, fallacy, ad hominem attacks, it's all BS, but it's only three to 5% of people, and when someone with your knowledge and experience takes the time and trouble to write a book about it, that signals something for people listening.

You're not going to waste your time, you're running university, you have stuff to do with your time. Few people understand the amount of energy it takes to put all of that knowledge into only, whatever, 80,000 words. It's thousands of hours of, like, "Do I really? Do I need to cut that?" We're not going to waste our time on that stuff, and then, to be able to hear you, I think is a different way.

Anyway, that's why I started this show, is I just wanted to be able to pick your brain, and [crosstalk 00:43:00].

Joseph Pizzorno: That's a great public service. One of the reasons I started Bastyr was because there's this huge body of knowledge that the pioneers of natural medicine have learned over the centuries about how to be healthy, and it was systematically removed from the populace by conventional medicine.

Anyway, let's go back to your question about mitochondria. Mitochondrial strategy is basically three parts. Number one is, one of the most important things you can do to not damage your mitochondria ... Always tell students, we have all these great herbs and nutrients, and things we can use for patients, but you first have to stop the damage. I don't care how good your herbs are, vitamins are, you're still causing damage, it's not going to do much good.

The second thing we want to do, is to, you might say, facilitate mitochondria to work the way they're supposed to with the right kind of nutrients, and in particular, a key, key, key approach is protecting the mitochondria from themselves, because the mitochondria produce a huge amount of oxidative stress every day just producing ATP. If you're not producing that ATP efficiently, you're leaking a lot of high energy electrons, and oxygen, and it causes a lot of damage.

The third factor is, how do you make the mitochondria work even better?

Dave Asprey: I love the way you think, this is exactly it.

Joseph Pizzorno: Okay, good. I'll say something on each of those three categories.

Dave Asprey: Yeah.

Joseph Pizzorno: Number one, in terms of things that damage the mitochondria, let me take two that people probably don't often think about. That is, do you drink alcohol. Now, whether you drink alcohol or not, it's totally up to you. If you drink alcohol, it does damage mitochondria, because, as you mentioned earlier, depletes glutathione. Now, if you drink alcohol in the form of beer or wine, interestingly enough, it doesn't deplete the glutathione. With regular alcohol, like vodka, for example, you see a drop in ATP production. Give the same amount of alcohol in the form of beer or wine, you don't get a decrease in ATP production.

Dave Asprey: Wow. Do you know why that is? I've never heard this.

Joseph Pizzorno: Some great data done, for example, a study was done in nuns in a cloister, never drank alcohol. They gave them de alcoholized beer, just one quart a day, and they increased their glutathione levels and their RBCs by about 30%.

Dave Asprey: So, it's a B vitamin thing?

Joseph Pizzorno: Maybe, but something in beer, clearly increases.

Dave Asprey: Since beer is also high in ochratoxin A, it's one of the things that causes the biggest hangover in people.

Joseph Pizzorno: There may be a lot of other things that are problematic, but if we're looking at the ATP, turns out there's something that helps them.

Dave Asprey: Got it.

Joseph Pizzorno: With wine, of course, the [resveratrol 00:45:38] increases glutathione levels. Conversely, if you also then drink alcohol in the form of aged things like whiskey, and scotch, and things like that, you actually damage mitochondria more. So, if you're going to be drinking alcohol, it's your choice what you do, well, drink the alcohol in the form of beer or wine, don't drink in the form of scotch, and you won't damage your mitochondria.

Dave Asprey: All right, I'm going to have to dig in on that. I've got an infographic that I offer people that says, no matter what alcohol isn't a good choice for your mitochondria, but if you drink the stuff that's already been charcoal filtered and distilled, at least you didn't have to take all the byproducts out along with it, so it's less of a load on the liver, and then you should take vitamin C, or glutathione, and you should consider taking activated charcoal with it to undo the damage from the acetaldehyde that forms in the first step of breaking it down.

Joseph Pizzorno: Make sure zinc levels are good, et cetera.

Dave Asprey: Right. The problem is, is so much wine and beer is full of glyphosate, especially American wine, and it's full of ochratoxin A, because our government levels here are not very good. I'll drink an organic french wine where the levels are two parts per billion, but I don't really feel good on most American wine, because it's got glyphosate in it. You're giving me food for thought here, I'm going to do some research, and it's possible, people listening, I may tweet the alcohol infographic, based on Dr. Pizzorno's stuff here, because I've never heard that before, so thank you for that.

Joseph Pizzorno: Interestingly enough, that study I quoted to you, was done in Europe.

Dave Asprey: Ah, that makes sense.

Joseph Pizzorno: [crosstalk 00:47:08], so it's interesting. Maybe, the beer they were drinking did not have as much contamination, [crosstalk 00:47:14].

Dave Asprey: They also use traditional species of yeast in their making, when they make stuff in Europe. The American species of yeast are hyper aggressive, they're bread that way, so there might be a difference there. Fascinating stuff. You blew me away on that one, that was step one, don't drink, basically.

Joseph Pizzorno: Okay, so, the next one is, step two, then, is protect your mitochondria from themselves. I won't get into a lot of detail, but there's a lot of mitochondrial [inaudible 00:47:38] damage that happens when you're not controlling those

high energy electrons. It turns out there are several strategies that are important. Number one is you want to get your glutathione levels up as much as you can, and you can either take it topically, take it lypozomally, or glutathione by itself is not very effective because it gets broken down to [systane 00:47:56], so your glutathione will still go up but it's an expensive way of doing it. My preference is [anacilisystane 00:48:03], because [anacilisystane 00:48:05] will get your glutathione levels up quite nicely.

In addition, critical, critical, critical, is coenzyme Q10. Coenzyme Q10 carries the high energy electrons from the various parts of the mitochondria so that the high energy electrons are being converted into ATP. If you have low co Q10, like, for example, you're taking a statin drug, now you're going to lose more of those high energy electrons, you're going to burn out your mitochondria more quickly.

The third factor I think is very ... Well, there's so many nutrients we can talk about being important for mitochondria. You said, limited number, let's just stick with that. Co Q10, and [inaudible 00:48:42]. Now, the third aspect, get your mitochondria to produce more ATP. There's been some fascinating research done in animals, and some [inaudible 00:48:52] in reproduction in humans as well, and there are supplements you can take like [acetylcarnitine 00:48:57]. What the [acetylcarnitine 00:48:59] does, is it helps transport the fatty acids in mitochondria more efficiency so you can produce more ATP. It's research that's been done where they look at how far an animal can run, a young animal, compared to an old animal, and the old animal can only run half as far as the young animal. If you give that old animal [acetylcarnitine 00:49:17], along with [alpha lipoic 00:49:19] acid, they can run as far as the young animal.

Here I am, I'm this old rat who plays basketball with guys half my age, so I'm doing all these things to get my mitochondria to work as well as possible, because I want to keep running the court, I want to keep enjoying this game that is so much fun for me to play.

Dave Asprey:

Those are awesome recommendations. Those are similar to some of the ones in Head Strong. There's a bunch of other things around modifying the Krebs Cycle, reducing electron leakage, increasing efficiency. One of my favorites is something that we manufacture, just came out with it, called Keto Prime. It's the last step of the Krebs Cycle before you take more electrons in from food, whether it's from ketones, or from [pyruvate 00:50:03], which comes from carbs or protein breakdown. The idea is, if you have any electron leakage, you run out of this thing called ketosuccinic acid, so if that's low, then your next cycle of the Krebs Cycle won't work, so you basically top up the last step of the Krebs Cycle so you can efficiently use food, even if there's electron leakage, you basically never lose the ability to run the full Krebs.

Joseph Pizzorno:

I have not run across that, that's interesting. I look forward to learning more about it.

Dave Asprey: I'll send something to you. That's something that I've noticed huge changes in my energy, especially around exercise, and cognitive function from doing it. It's a ketone, but it's not the normal ketones that we get from going into ketosis, kind of cyclical diet.

Joseph Pizzorno: Interesting.

Dave Asprey: That's one of the many things, like you said, we could talk probably for six hours about all the different nutrients. I think for people listening, they get a little bit overwhelmed, like, "Okay, I'm gonna spend \$2000 a month on mitochondrial enhancing supplements, and I don't know which ones work, and I'm afraid I'm going to have expensive pee, and you go through all this stuff, but I like it. What you're saying there is, something for glutathione, you like NAC. I have concerns about the rate limiting, like, you can only convert so much NAC before you run out of co factors, but yeah, NAC works to a certain level.

Then you're saying co Q10, which you and I would totally agree on. Everyone listening, you can get co Q10 all over the place, it's kind of a commodity thing. I buy into co Q10 to an unusual acid base form of PQQ ...

Joseph Pizzorno: PQQ, yes.

Dave Asprey: ... and then we make little nano particles, or, they're actually microparticles, suspended in water for better absorption, which is something called Unfair Advantage, that we manufacture, but that's not that much co Q10. There's no reason that people shouldn't ... I recommend 100 milligrams a day. What's your number for ...

Joseph Pizzorno: I personally have been taking 100 milligrams of co Q10 a day, for 20 years, and 10 to 20 milligrams per day depending upon how the cost has changed, of the PQQ, for almost 10 years. Good to see our thinking is quite congruent.

Dave Asprey: I started PQQ at 30 milligrams, and I did that for two years, about 10 years ago, when the research first came out, but I could never feel any difference, and I feel when my mitochondria work better. That was why we came up with a delivery system in Unfair Advantage, because that stuff, it hits me, like, "Okay, something just happened," and I think it has to do with the only manufacturer of PQQ out there makes a disodium salt form that precipitates out in your stomach, so the absorption of that is almost as bad as glutathione, if it's not properly packaged. It's one of the things that, if you're feeling it, you should do it. Eat it with a high fat meal, that might help. I don't have great lab data on it, but the science is that stomach acid's gonna kill it, so you take it with a high fat meal, the stomach acid, you take it on an empty stomach, it doesn't absorb well, but at least it doesn't ... I don't know.

I'm a fan of PQQ, I would do it intravenously if there was a good way.

Joseph Pizzorno: Interesting, interesting.

Dave Asprey: Do you believe in IV vitamins, and other things like that?

Joseph Pizzorno: Good question. As a clinician, I of course, have seen people at wide range of health and disease status. In general, I always prefer to get it through food, number one, if the person is not able to get the nutrients adequately from food, I then do supplementation. But then, if their digestive system is so damaged, then I will do IV vitamins.

You have to be pretty careful with IV vitamins, because you have to realize that when you do a high dose of a single, or just a few molecules, you might say, you have to look at what else it does in the body. Yes, I do it, but I only do it as my last resort, not as a first resort.

Dave Asprey: I tend to, about every two or three weeks, I get a [Myer's 00:53:58] cocktail with a methylated forms of vitamins and some glutathione, and a little bit of B-12, and all that.

Joseph Pizzorno: [crosstalk 00:53:59], yes, right.

Dave Asprey: I found that works for me, but I also travel 125 days a year. I'm a dad, and a CEO of a company, and an author, and a radio show host, I'm pushing limits, and I find that helps me to be resilient, but I think for the average person, that could be overkill. Who knows, maybe I'm imbalancing something.

Joseph Pizzorno: Yes. I think what you said, which is most important, that is understanding what your body needs, what your unique needs are, and then meet those. In general, they can be met with supplementation, but sometimes you need the IV approach. I'm not opposed to it, I prefer to do the other things first, and then if you don't get the results, then, like you said, do the IVs.

Dave Asprey: Beautiful. I feel like we could have another two hours of interview, but we're coming up on the end of this, and the good thing is we'll do an in person one, because we're geographically close, and because you're too interesting not to do that.

I want listeners to understand that in the Toxin Solution, I didn't kinda walk through all parts of it, but you basically have a nine week thing where you step people through the different parts of detox, which is an effective way to do it. I really like the way you're thinking about the system of the body, and I would encourage you, if you're listening to this, and this is resonating with you, it's worth checking out the Toxin Solution. [thetoxinsolution.com](http://thetoxinsolution.com).

Joseph Pizzorno: Can I just, real quickly, just a couple minutes, or one minute.

Dave Asprey: Yeah.

Joseph Pizzorno: So, what I do with the Toxin Solution, is, first off say, "Here's how toxins damage your body. Here's where they're coming from, here's how you avoid them, and then how do you prepare your body to get rid of the toxins? How do you get your gut cleaned up, how do you get your liver functioning properly, how do you get your kidneys functioning properly?" Because, I don't think doing a detox program without preparing your body for detox is a very good idea, because you release the toxins from the tissues, and there's no place for them to go to get out of your body, you're just going to redistribute them and cause damage as well.

So, stop the toxins coming in, prepare your body for it, and then I provide a really intense program for now getting the toxins out. Then, the final chapter is something I think you'd really enjoy, and that is, how do you live a toxin free life? How do you choose the household cleaning agents, and how do you choose health and beauty aids, and how do you choose your food, how do you prepare your food, what kind of packaging materials do you use? All these things we gotta do ...

Dave Asprey: How do you prepare your food, tell me that you're telling people to avoid charring and grilling and frying, is that part of it.

Joseph Pizzorno: Absolutely.

Dave Asprey: Yes, that's in my book as well, all right, no one does that in paleo. The whole paleo, we're like, "Deep fried whatever." No, it doesn't matter if it's grass fed beef if you burn the crap, it's going to be bad for your mitochondria. [crosstalk 00:56:41].

Joseph Pizzorno: [inaudible 00:56:43] ages, and you produce all this oxidized lycine that's carcinogenic, it's just terrible.

Dave Asprey: I love it that you're talking about that, because these are things that really matter that we do every single day that people just don't know about, like, "But it tasted good." It doesn't matter if it tastes good if it's knocking you out 10 years from now, you still don't want to do it. Find something else that tastes good.

Joseph Pizzorno: Yes, yes. Have you heard of the healthy stir fry created by my friend [inaudible 00:57:08]?

Dave Asprey: I haven't, I'm guessing some water is in it, as well, or how does it work?

Joseph Pizzorno: Yeah, no oil. You put water in the pan so it doesn't get too hot, you saute your vegetables in the water, and then, after you've cooked them, then add oil.

Dave Asprey: That's exactly how I cook, to a T. You never want to cook in oil. Oil's precious, and when you heat it, even if it's butter and all, it's just not a good thing

because the heat transfers too much heat to the food, and water rate limits at 212 when it turns into steam. I love it, and this is in your book as well?

Joseph Pizzorno: It is. I think I mention it in the book. It's been a while since I wrote it. I believe I talk about healthy stir fries, but I'm not sure if I remember, sorry.

Dave Asprey: Okay. Yeah, the standard Bulletproof Techniques, I have a cookbook as well, and it's, you always cook with a little bit of water, and you don't want to caramelize, and char, and brown, because those, they trigger inflammation, and yes, they taste good, but it's okay to eat things that also taste good that don't cause inflammation.

All right, I have one more question for you, and this is a question that I've asked every guest on this show. It's based on your work, not just your work, just your whole life's progress. If someone came to you tomorrow and said, "Look, I want to perform better at everything I do in life." What are the three most important pieces of advice you would give me? What would you offer them?

Joseph Pizzorno: I've been [inaudible 00:58:28] ask that question, I'll give you the simplest things. Number one, eat real food that has been organically grown and properly prepared. Number two, become much more aware of how toxins get into your body. Number three, build muscle mass. While I think exercise is important, I think muscle mass is even more important, and we can get all those reasons, but you have to realize that I've got more muscle mass, those muscles cells are producing ATP, and even when you're not using those muscles they're producing more ATP and makes everything else in your body work better.

Dave Asprey: I love that last one. I don't think anyone's ever talked about muscle mass, that might've been an answer I've heard once out of 350 episodes. It's interesting, I just took a research compound two months ago, that in animals increases skeletal mitochondria by 50% in four weeks. I felt a huge difference, as in, I stopped needing to wear a jacket in snow storms. I just radiating heat, I had to back off my thyroid meds, and I put on 19 pounds of muscle with four workouts. It's kind of ridiculous.

Joseph Pizzorno: That is pretty stunning.

Dave Asprey: It's a [inaudible 00:59:37], selective androgen receptor modulator. There's a whole bunch of mitochondrial hacking coming down the pipe, where I have no idea what the long terms effects of that'll be, but I'm betting they're good. We don't know, but I love your last one about muscle mass, because it does matter, and it doesn't mean you work out every single day hard, it means you do what it takes to get your muscle mass back.

Joseph Pizzorno: I thought it was interesting in your book, because I looked at what you said there, and if I understood you properly, you do what I do, and that is I, once a



week, do real intense, high weight work. Very short period of time, real intense, and it's incredibly effective.

Dave Asprey: It saves time, and it works better than beating yourself up everyday like I used to do when I weighed 300 pounds I worked out an hour and a half a day and I couldn't lose the weight.

Joseph Pizzorno: I did two years of standard [inaudible 01:00:22] training with a trainer. It gave me some benefit, and then I did the high intensity training, and in six weeks, I increased my vertical leap by four inches.

Dave Asprey: Yeah.

Joseph Pizzorno: What that meant was, I actually had a 25 to 50% increase in strength. It was just incredible how much more effective it was.

Dave Asprey: When you get it right, you can quantify the measurement, and it saves you time, and I also just believe by freeing up time, everyone's too busy, they want more time with their kids, they want more time for work, or their family. If you're saving an hour a day of working out, and you're getting better results, that kind of makes the world a better place.

Joseph Pizzorno: If you do it right 20 minutes a week is all you need to do.

Dave Asprey: This is so cool. We're up on the end of the show. People can learn more about you, and I think anyone who listened to this show for the whole length understands that you spent some time thinking about these things, and that you're a living example of what you're talking about. You've put this down, your new book is very well thought out, and it totally passes the bar, from my perspective, around the way to think about it, and just the way to approach the toxin problem, which is under recognized in almost all health literature, especially the popular stuff.

It's called the Toxin Solution, and you can get it at, funny enough, [thetoxinsolution.com](http://thetoxinsolution.com), and for listeners, you're listening to Dr. Joseph Pizzorno, who's a founder of Bastyr University in Seattle, and one of the top, probably, 25 most influential experts in the field of functional alternative medicine. This is a pretty special interview for Bulletproof Radio. It's been a lot of fun for me, and Dr. Pizzorno, thanks for being on the show.

Joseph Pizzorno: Thank you, it's been great talking with you, and I look forward to our lunch. There's a lot more to explore here.

Dave Asprey: Me too.

If you liked today's episode, you know what to do. Head on over to the Toxin Solution, and pick up a copy of Dr. Pizzorno's book, because it's actually going to

make a difference for you, and Bulletproof Radio's about making a difference. While you're at it, since you're in book buying mode, you might also head over to [orderheadstrong.com](http://orderheadstrong.com), and pick up a copy of that too. You'll find that if you do the toxin avoidance strategies in the Toxin Solution, your mitochondria will work better. Do some of the mitochondria upgrade strategies in Head Strong, and your mitochondria will work better.

More mitochondria equals more cognitive function, because you have the most mitochondria in your neurons, so these things stack really nicely, and if you only buy one of the two books, that's totally cool, too. Either one is going to benefit you, and I am certain you got value for your time this episode, and if there was more we should've talked about, tell me in the comments, and I'll make sure to talk about those things next time Dr. Pizzorno and I meet and we record it for you.

Have a great day.