

Upgrade Your Metabolic System with the Right Foods – Dr. Robert Lustig – Best of 2021

Dave Asprey:

You're listening to Bulletproof Radio with Dave Asprey. My guest today is Robert Lustig, who is a pediatric neuro-endocrinologist who spent 40 plus years treating and finding ways to prevent obesity, diabetes. New York Times bestselling author of several books about sugar, processed foods, and what happens when we get fat. And this is personal for me, because I weighed 300 pounds. I got very heavy as a teenager. By the time I was 23, I hit 300 pounds. And if I'd have known what he knows, it wouldn't have happened. And if I'd have known of his work, when I was 20, which did exist when I was 20, it would've helped me greatly. But I didn't.

And his newest book is looking at eight pathologies that underlie everything that happens with chronic disease. And he just teaches us how processed food has impacted our health, our economy, our environment, over the past 50 years. Basically, this is how we've been screwed by big food. In fact, you should've used that title. Welcome to the show, Dr. Lustig.

Dr. Robert Lustig:

Thanks so much for having me. I appreciate the intro. I've only actually been doing obesity work for about 25 years. Before that I was taking care of short kids, but the short kids got fat on me.

Dave:

Oh man. I guess if you can't grow up you grow out. Is that how it works?

Robert:

Yeah, something like that. Horizontal not vertical.

Dave:

It's interesting, did you learn a lot from working with growth hormone deficient kids and all that? Did that tune you in to metabolism?

Robert:

Oh, absolutely. Growth hormone is extraordinarily important in terms of a metabolic, not just growth factor in terms of height, but also metabolic factor in terms of lipolysis. So growth hormone deficient kids have fat depots in places they shouldn't have fat depots. My colleague here at UCSF, Ethan Weiss, has done a phenomenal job of being able to actually discern how growth hormone does what it does, and why patients who have growth hormone receptor deficiency, that is Laron dwarfism, even though they become markedly obese are actually protected from chronic disease such as type II diabetes and heart disease.

Dave:

Oh, interesting.

Robert:

And has to do with what's going on in the liver, versus what's going on in the fat.

Dave:

Are you on growth hormone now?

Robert:
Myself?

Dave:
Yeah.

Robert:
I wish. No, I'm not.

Dave:
What do you mean you wish? You could get on growth hormone.

Robert:
First of all, it's about \$40,000 a year. Second of all, I don't have that kind of money. I'm an academic. And number three, I'm not that kind of guy. I'd rather do it with food.

Dave:
If you could get growth hormone for free, would you take it now?

Robert:
No, not at this point.

Dave:
Okay, you wouldn't. I was wondering about that, because you know a thing or two more than the average bear about that.

Robert:
I do.

Dave:
Why wouldn't you go on growth hormone?

Robert:
Well, in part because there's nothing that diet and exercise can't do that growth hormone does do. And why take the risk?

Dave:
Fair point. Before we get into your new book, which has some pretty profound quotes on it, Dale Bredesen, who is just a fantastic doctor, a friend whose been on the show, wrote The End of Alzheimer's, he calls you a modern Copernicus and says you have the expertise to recognize the charade of processed food encouraged to tell the truth, which is awesome. So guys, if you're looking for the book-

Robert:

That was quite the comment. I thanked Dale for it. I don't know about the Copernicus part, but whatever.

Dave:

At least he didn't call you Galileo, because they burned that guy at the stake. So if you're going to have an old, wise person to be your spirit person, there you go.

Robert:

Right.

Dave:

Dale is one of those guys who just unpacked Alzheimer's. And the interview with him is one of my favorites on Bulletproof Radio.

Robert:

Well the fact is that what Dale showed is exactly what I show. And the reason is because Alzheimer's and type II diabetes are virtually identical in terms of what the mitochondria in either your liver or your brain are doing. So what Dale writes about is what I write about. The overlap is really remarkable.

Dave:

If you get diabetes your chances of getting, well Alzheimer's or cancer or cardiovascular disease, or pretty much having bad luck, from a health perspective, seems like it goes up, right?

Robert:

Absolutely.

Dave:

And you've dialed in on diabetes.

Robert:

So pre-diabetes is thought by some to be the precursor to diabetes. And other people think it's a figment of other people's imagination. It's a complex issue. There was an article in Nature not too long ago that basically argued that pre-diabetes was really not a problem at all. I believe that it is a problem.

Having said that, if you look at the number of pre-diabetics who go on to diabetes, it looks like it's about 33%. So just having pre-diabetes doesn't necessarily mean that the end is near. There are things that you can do to alter that. What we have determined is that pre-diabetes is a state of insulin resistance with reduced insulin response. Now the question is, can the pancreas recover? And the answer is, absolutely. And this is where people don't get it yet.

The American Diabetes Association says that diabetes is a chronic, progressive decline in beta cell functioning, leading to insulin deficiency for the degree of resistance. This is complete, total hogwash.

Dave:

Yes.

Robert:

And the reason we know that is because-

Dave:

Is it true-

Robert:

Yeah. Go ahead.

Dave:

Sorry, there's a lag on the line. I didn't mean to interrupt you. Tell me the reason. I'm interested.

Robert:

Well the reason is because those beta cells that are releasing insulin in the pancreas, they are affected in the same way the liver is affected. And we now know that these patients have non-alcoholic fatty pancreas disease, not just non-alcoholic fatty liver disease.

Dave:

Wow. I didn't know that.

Robert:

And so if they can clear the fat from their pancreas, those beta cells can come back full force. And so you can reverse type II diabetes, and you can certainly reverse pre-diabetes, if you ate right. But if you don't eat right-

Dave:

What does eating right mean?

Robert:

Well, that's the whole reason I wrote the book.

Dave:

Exactly.

Robert:

So I wrote Metabolical to basically explain what is healthy. And based on the empiric data, based on the science, based on the pathologies that I describe in the book, that belie chronic disease, I distilled all of the information down to six words, two precepts, six words. Protect the liver, feed the gut.

Dave:

There you go.

Robert:

Any food that does both of those is healthy.

Dave:

So you recommend tequila?

Robert:

That doesn't really protect the liver very well.

Dave:

It slams both. What does protecting the liver really mean?

Robert:

So protecting it from, number one, the onslaught of mono and disaccharides, so glucose and fructose, so sugar and refined carbohydrate being, shall we say, the big kahunas in the story. But it's also protecting it from excess branch chain amino acids, because branch chain amino acids ultimately become organic acids, go into the Krebs cycle in the liver, ultimately overwhelm the liver's capacity to be able to metabolize them, end up as fat as well. And also, protecting it against various toxins, including heavy metals, including things like glyphosate, et cetera. So there are a lot of things that go into protecting the liver. And we're not protecting the liver at all. We're basically trying to kill it.

And the second thing is feed the gut. And the question is, what does that mean? Well, as you've heard, there's this thing called the gut microbiome. And the gut microbiome matters. It's not just good and bad bacteria, it's a whole slew of things. But in general, the bacterial content of the gut basically outnumbers us 10 to one. There are 100 trillion bacteria in the intestine, versus the 10 trillion cells we have in our body. And they make stuff. And the question is, does that stuff get across into our bloodstream to affect us?

So there are barriers. There are junctions between the cells. And there are proteins called tight junctions or zonulins, this is what goes wrong in celiac disease, that keep whatever's in the intestine in the intestine. Now the question is, does it ever get across? And the answer is, more and more it does. And the reason is because those tight junctions are failing. And what's making them fail? Well specific things in the food. And also lack of energy.

And the question is, well you're putting all this stuff into the intestine, why aren't they getting enough energy? Well it turns out fructose actually depletes the ATP within the intestinal epithelial cell, because when the fructose enters it has to be phosphorylated. And so it goes from fructose to fructose, one phosphate. That takes ATP down. And that leads to incompetency, transient incompetency of those tight junctions. So stuff can now get across.

And if stuff gets across, you've got chance for inflammation, you've got chance for introducing a protein that might end up leading to an antibody response or a T-cell response. Now you've got food allergy. And it's possible lipopolysaccharide could get across, and that could cross more inflammation and possibly insulin resistance. Ultimately, those same zonulins are in the brain, as well as the intestine. So if something's affecting them in the intestine, maybe it's affecting them in the brain. And now you've got mitochondrial dysfunction and defective neurotransmission in the brain. Maybe you've got psychiatric disease. Maybe you've got dementia.

So all of these diseases that we are seeing increasing in frequency over the course of the last 50 years, commensurate with the advent of processed food in our diet. Because we are not protecting the

eviler, because we are not feeding the gut, are basically inexorable. They are to be expected. And the problem is, as long as we eat badly we will continue to suffer from these. And, of course, they are breaking the medical bank of every country that has adopted the Western diet.

Dave:

In your new Metabolical book you certainly talk about this. For listeners today, what are the three things that are the worst at poking holes in the gut that people could start paying attention to?

Robert:

Well the lack of fiber. So if you don't have fiber, basically you're not feeding your gut. The intestinal bacteria, if you're not feeding them they will feed on you. They will actually dissolve the mucin layer that surrounds each intestinal epithelial cell as a barrier. You can see it on electron microscopy. You can see the bacteria apposed, A-P-P-O-S-E-D, right on top of the intestinal epithelial cell. And this is probably one of the reasons for irritable bowel syndrome and also for inflammatory bowel disease, is the bacteria are supposed to be separated from the intestinal cell by this mucin layer. Well, if the bacteria doesn't have anything to eat, it'll eat that. So that's one thing.

In addition, the colonic bacteria are very adept at eating soluble fiber and turning them into a product known as short chain fatty acids, propionate, butyrate. And it turns out those are anti-inflammatory and also anti-insulin. They are insulin suppressant. They keep your insulin down. So feeding your gut is both a mechanical thing and it is a metabolic thing. And it is essential. The problem is we take the fiber out of food, on purpose, for shelf life, because you can't freeze fiber.

Dave:

Well there's two kinds of fiber. There's what I call prebiotic fiber or soluble fiber. And I've been really big on that since all the research in my anti-aging book. And then there's insoluble fiber, basically roughage.

Robert:

Correct.

Dave:

And I know that the soluble or prebiotic fiber is something that feeds ... it makes butyric acid and propionic acid, which are both pro-ketogenic as well, just taking them will put you in ketosis to a certain extent.

Robert:

Right.

Dave:

At least it'll make ketones. What I don't know though is your perspective on the roughage or the insoluble fiber. How important is that?

Robert:

Oh, it's extraordinarily important. The insoluble fiber is not there as food, per se. But it is there for the barrier function. That protect the liver, that insoluble fiber is essential. So think of it this way. You have a spaghetti colander, okay, metal bowl with holes in it. You run the water, water goes right through. Okay.

Now take a blob of petroleum jelly and throw it into the center of the colander. Run the water. Water still goes through. It might bounce off the petroleum jelly, but nothing's really changed. Now take your finger and rub that petroleum jelly all the way around the edges and into the center of that colander. Now run the water. Now you've got a barrier.

Dave:

Not much is going to go. Right.

Robert:

That's right. Now you've got a barrier. And the point is that the insoluble fiber that we eat, the cellulose, the roughage, as you put it, acts as the colander. Or another way to think of it is the lattice work of a fishnet. The soluble fiber acts as the petroleum jelly, or say the kelp that the fish net gets clogged with. Together, the soluble and insoluble fiber, plus the geometry, which is absolutely essential, form this impenetrable secondary barrier. And you can see it on electron microscopy. It's a white-ish gel that forms on the inside of the duodenum. And what that's doing is it's preventing the transport of mono and disaccharides and other amino acids from the duodenum into the portal vein, which would then go straight to the liver.

So the goal is to protect the liver, to protect it from the tsunami of stuff that would ultimately hit it if that fiber weren't there. The problem is, when you take the fiber out of food, whether it be the soluble fiber or the insoluble fiber or both, which is standard, is to take both out, you now basically have put your liver at risk. So the insoluble fiber helps that barrier form. So it is absolutely essential.

Now, if you don't have it, the soluble fiber still has benefits. It will still be metabolized by the colonic bacteria to short chain fatty acids, which is good. It will still move the food through the intestine faster, like greasing the skids, so that you will get the satiety signal, the peptide YY signal, at the end of the intestine sooner, so you might not eat that second portion, which is still a good thing. But that protect the liver, it's gone. You haven't protected the liver at all.

Dave:

Interesting.

Robert:

There are six things that fiber does that are positive for your health. And if you take the insoluble fiber out, which is what happens when you make a smoothie, because you've basically sheered the insoluble fiber to smithereens, you will get three out of the six benefits of the soluble fiber, but you will have lost three of the six benefits of the two together. So those smoothies, if they're green smoothies you don't have much to protect the liver from, because there's not that much sugar in the first place. But if they're fruit smoothies, eat the fruit.

Dave:

I was a vegan for a while on my path of trying all the different things. And I did lose a bunch of weight on that diet, and it gave me a bunch of autoimmune issues, oxalic acid. I was eating tons of fruits, full of fructose. And it was an experiment in having less weight but having a brain that didn't work, hormones that didn't work, and an immune system that didn't work.

Robert:

Indeed.

Dave:

And I generally don't recommend a vegan diet for people. But I'm curious what your perspective is on that?

Robert:

Yeah. Look, there's a war going on. And I'll tell you, I think it's a false war. I actually call it out in the book saying, "The vegans and the ketos, they're fighting with each other because you're either eating meat and you're a carnivore or you're eating plants and you're vegan. And there's nothing in between." These are the two polar extremes and they have nothing to do with each other. And I would argue that actually they are the same. They are actually the same.

Dave:

Yeah.

Robert:

Basically if you protect the liver and feed the gut, they are the same. And a vegan diet, if it's done properly, and I couch that in very specific terms because there are a lot of ways to not do a vegan diet properly, because Coke, Doritos, and Oreos are all vegan. So if you eat-

Dave:

They're plant based, they're good for you.

Robert:

They're all plant based but they're crap. Okay.

Dave:

That's because plants are cheap, right?

Robert:

So if you eat a truly vegan diet, with twigs and sticks as it were-

Dave:

That's what I did.

Robert:

Kind of like what the Ornish diet is. It can work. And Dean Ornish has data that shows reversal of cardiovascular plaques over time. Now, I'm not going to tell you-

Dave:

If you meditate at the same time and the meditation shows the same benefits without the diet.

Robert:

Yeah, right. Absolutely. So the point is, you don't die on it. All right.

Dave:

That's a fair point.

Robert:

Okay, you don't die on it. It's not that I'm specifically against veganism. I am against vegans telling me what to eat. That I'm against.

Dave:

I think everyone's against that.

Robert:

Well, no, not everyone is. The point is that what you eat should be a choice.

Dave:

There you go.

Robert:

And I am not against veganism and I am not against people who are on a ketogenic diet. I'm not against carnivores. The point is, know what you're doing and do it right. Because it's very easy to do veganism wrong. And to be honest with you, you can do keto wrong also.

Dave:

Oh, most people do, to be very straightforward. That's been my biggest concern.

Robert:

After two months, most people who think they're on a keto diet are not on a keto diet, because if you check their ketones they're gone. And the reason is because carbohydrate has entered into their diet, surreptitiously, without their knowledge. And the insulin response from that carbohydrate has shut down ketogenesis so that it's not even there. And the worst diet you can be on is a keto diet gone wrong. Because what that really is, is a high fat, high insulin, medium carbohydrate diet. And that is basically the processed food diet.

So if you're going to do a keto diet, you have to monitor. You have to know what you're doing. And you have to really be religious about it, and fastidious. You have to be almost obsessive about it. Now, does it work? Yeah, absolutely it works. And I used it in clinical all the time. So I am not against the ketogenic diet, I'm for it. It is the best way to deal with the worst insulin resistance in the toughest patients. And when you use it, it will work. The point is that it's not something you do haphazardly. It's not something you do in the field, without help.

Dave:

I have found that if people want to go vegan in a way that's appropriate, as in not eating a bunch of inflammatory stuff, that you do that for a month or two, fine. It works very well. You do it for six months or a year, it usually doesn't, because of changes in fatty acids and cell membranes. And when you go

keto ... I was stress testing the principles of The Bulletproof Diet, which is not a keto diet, it's a cyclical keto diet when you're trying to lose weight. And it's a high vegetable diet, the right vegetables, with moderate protein and lots of good fats.

Robert:

Right.

Dave:

But to get there I spent three months doing extreme keto, one serving, a small serving of green vegetables a day, the rest of it fat and protein. And by the end of that I developed an egg allergy. Who would've thought? I created the perfect environment for me to not have a barrier in my gut that worked very well.

Robert:

I see.

Dave:

And it's one of the reasons I warn people, don't over fast, don't over keto. Do it for a couple weeks. You can go out, you can go back in. What's your take on cycling, even a vegan versus a keto? Two weeks vegan, two weeks keto? Good, bad, indifferent?

Robert:

To be honest with you, I think if you ate real food this problem would really take care of itself.

Dave:

You don't have to do it. It does.

Robert:

I don't think you have to cycle. And I don't think you have to be on a "diet." I don't think you have to be watching it. I think if you ate real food, rather than processed food, the fiber would take care of the glucose excursions. The amino acids, the protein would take care of both satiety and also cell repair. And I think you would have the best of both worlds. The problem is that's not what the food industry is selling.

Dave:

What would happen if you took a big old scoop of gloppy, soluble fiber; I'm sorry, the stuff that's gloppy is actually the insoluble fiber; and a big old scoop of soluble fiber and you just drank that in a sawdust like thing right before every meal and any junk food. Can you get away with it?

Robert:

I wish I knew the answer to that, because everyone asks me that. Dave, that's actually a common question people ask me is-

Dave:

People like their Oreos.

Robert:

Yeah. Can you game the system? And the answer is no one's demonstrated the science on it yet. I don't know. Potentially, at least partially, possibly. But I don't actually know that for a fact. So I'm a little loathe to give you a definitive answer.

Dave:

And that's a scientifically pure approach there. If you had to guess? I'm guessing you're going to be better off if you do that than if you don't do that.

Robert:

Yeah, probably. That would be my guess, it would be better to do it than not to do it. But to be honest with you, why would you want to do that? Why don't you just eat real food and get all the benefits and none of the risks?

Dave:

I live on a farm. We raise our own food. We raise the animals. We raise the vegetables. I eat real food, and that's how I do it. But every time I talk to people, "But I like my pizza." I don't care, if you like heroin you still shouldn't do heroin. It's not about whether you like it. I make food that you like too, that makes you feel good and that does what it's supposed to do. But for the people listening who are just not going to do it, it feels like increasing your fiber intake via any means necessary is a good deal.

Robert:

Well it is. If you do it with Fiber One bars, then not so much. Because that's only soluble fiber. Basically no one's figured out how to put insoluble fiber back into food. It's not miscible. So the processed food industry can't seem to do it. Soluble fiber, that's easy. Virtually everything's got inulin in it or psyllium in it or some form of a pectin in it. That holds jelly together. That's soluble fiber.

So the point is, you need both. And real food gives you both and that's what works. And that's why you're doing well, is because you're eating real food. There are people who want to splurge, and I am all for splurging. I am totally for splurging. But inherent in the word splurge is that it's rare. Okay, so-

Dave:

I'll just do it at lunch.

Robert:

Listen carefully, audience. I am for desert, for desert. I am not for desert for breakfast, lunch, dinner, and snacks.

Dave:

Yeah.

Robert:

All right. And that is the real problem, is that we are eating desert for breakfast, desert for lunch, desert for dinner, desert throughout the entire day. And the reason is because processed food is high sugar, low fiber. Real food is low sugar, high fiber. Real food works, processed food doesn't, for all the reasons I've discussed, because of these eight pathologies which we haven't yet mentioned. Let me go ahead and just throw them out there.

Dave:

Yeah, let's go through the eight pathologies. That's important.

Robert:

It is important. So, type II diabetes, hypertension, lipid problems, cardiovascular disease, cancer, dementia, polycystic ovarian, non-alcoholic fatty liver disease. These are the chronic metabolic diseases that doctors can bill for. They all have ICD-11 codes. They all have CPT codes. Doctors get paid for those. They are not real diseases.

Dave:

Ooh. Do tell.

Robert:

They are manifestations of the real diseases, because the real diseases are the sub-cellular pathologies which belie each of those. So, yes type II diabetes is called a disease. It is not. It is a symptom of a disease. And the reason I can tell you that is because there is no cure. There is no cure for type II diabetes. In fact, the only treatment is food. There's no medical treatment for type II diabetes. There is Metformin, that's about as close as we get. But oral hypoglycemics, insulin, the glitinides, et cetera, they're basically just covering up the symptoms. All they're doing is lowering your blood glucose. Well the glucose is not the problem. The glucose is the symptom of the problem.

Similarly, high LDL. The high LDL is not the problem. The high LDL is the symptom of the problem. The real problem is what's going on in the liver that leads to that. Same thing with high blood pressure. Ultimately it's what's happening inside the endothelial cell that really makes the disease the disease, not the blood pressure itself.

So all these medicines that we currently throw at these various chronic diseases, they are treating the symptoms of the disease but they are not treating the underlying pathology. The disease is still there. It's like giving an aspirin to a patient with a brain tumor because they have a headache. The problem is still there.

So, what is the problem? What are those pathologies that are belying all the chronic diseases that I just mentioned? Well here they are, in order. Number one, glycation. So, the addition of a glucose or a fructose molecule to a protein. That makes the protein less flexible. It makes the protein aggregate. It ultimately leads to dysfunction of the protein for various reasons. Number two, oxidative stress. Every time that reaction occurs it throws off a little hydrogen peroxide, a little reactive oxygen species, which can cause damage. It can cause lipid peroxidation or protein denaturation, unless it is quenched by an antioxidant. That's why you need antioxidants. And the antioxidants are stored in the peroxisomes of cells.

The problem is that processed food is low in antioxidants. And so those reactive oxygen species go hog wild and cause all sorts of damage, leading to a process called the unfolded protein response in the endoplasmic reticulum. And that means that the insulin molecule, for instance, can't fold, or the

insulin receptor molecule can't fold. And so now you have insulin resistance or insulin deficiency. Now you've got diabetes.

Number three, mitochondrial dysfunction. So your mitochondria is where you burn energy. Well, unfortunately there are things that can damage the mitochondria and there are things that can cause mitochondrial dysfunction. And they are basically all related to processed food, whether it be fructose, whether it be lack of carnitine, whether it be linoleic acid. Ultimately all of these things lead to defective mitochondrial function.

Ron Kahn, the head of the Joslin Diabetes Institute just did a study in 2019 where he basically showed that glucose makes mitochondria work better, and fructose makes mitochondria work worse. And he actually came out and finally said, "A calorie's not a calorie." It only took him how many years. Now, for the first time, he actually says sugar is bad. But you know who doesn't? The American Diabetes Association doesn't say it.

Dave:

Well that's because they're a lobbying group for diabetes, right? They're trying to cause it so they can have more donations.

Robert:

Right. What would happen to the ADA if we actually got rid of diabetes? So, number four, insulin resistance, this phenomenon. And there are different parts of the body that can become insulin resistant. And the different parts of the body manifest that insulin resistance in different ways. Let me give you an example. My favorite mouse. My favorite mouse of all time, because it takes all of modern medicine and basically throws it out the fricking window, turns it on its head. This is the mouse that sends everyone back to medical school. It is called podIRKO. And it is the glomerular podocyte, insulin receptor, knockout mouse. You're missing you insulin receptor in the kidney of this mouse. That's what's missing.

So this mouse is euglycemic. This animal has normal glucose tolerance. This animal has a glucose level better than yours. And it has the worst diabetic nephropathy of any animal model on the planet. You say, "How can it be diabetic nephropathy if the glucose is normal?" And the answer is because it's not the glucose that causes the kidney disease, it's the insulin. The lack of insulin action on the kidney is what causes the kidney to fail, not the high glucose. And I do not know why doctors don't get this.

Dave:

But doesn't high glucose also cause that advanced glycation end product hormone?

Robert:

Oh, absolutely. So you want that glucose to come down. That's the glycation part. But that's not what's killing the kidney.

Dave:

Got it.

Robert:

The insulin is killing the kidney.

Dave:

So it's an insulin problem.

Robert:

Yeah.

Dave:

So glucose and insulin are bad.

Robert:

Oh yeah. Absolutely. Of course.

Dave:

That makes people say, "Oh, you're a keto guy." But you're not a keto guy. You're a moderate carb guy, a non-sugar guy.

Robert:

I'm a high fiber guy. Because if you look at the glucose excursion on a high fiber diet, it looks exactly like the glucose excursion on a low carb diet. And there are studies that show that.

Dave:

Yeah.

Robert:

So ultimately, they do the same thing. So that's why I am not married to either diet, is because you ultimately get the same thing out of it. Keep the glucose down. Keep the insulin down. You got to do both.

Number five, membrane instability. So this is all about Omega-3s and Omega-6s. There's a whole literature now ... Basically it's like a balloon. If you poke your finger into a balloon, what happens? Your finger comes back and the balloon is fine.

Dave:

It's stretchy.

Robert:

Okay. Now if you poke the balloon with a pin what happens? You get a popped balloon. Why is that? Well, in fact, your neurons are basically exactly the same. And so Omega-3s allow for membrane stability, and what's known as membrane fluidity. So they allow those membranes to be distensible. But if you have more Omega-6s, you don't have that. Or if you have more saturated fat, you don't have that. So keeping your membranes in top shape is really important. And Omega-3s are the way to do that.

Dave:

When you say Omega-3s, you're talking about EPA and DHA?

Robert:

Both

Dave:

Or are you talking about the vegetarian Omega-3s that act like Omega-6s mostly?

Robert:

No. I'm talking about EPA and DHA. DHA you can get from algae.

Dave:

Right.

Robert:

EPA you can't. EPA only comes from marine oils.

Dave:

And you need them both.

Robert:

You need them both. And ignoring the EPA to get the DHA I think is a big mistake.

Dave:

I'm sure big food is behind that too, because they can grow algae cheaply and they have a hard time getting proper marine lipids, like from fish eggs, which is my favorite source. That's what I use in the stuff I made for Bulletproof.

Robert:

Well plus cheap marine oils smell like fish.

Dave:

Yeah, there's a problem with the cheap ones too, right. So quality really matters there.

Robert:

It really does. So that's a big issue.

Number six, inflammation. And we talked about inflammation earlier in terms of this barrier in the intestine. So if you basically cause dysfunction of those tight junctions in the intestine, you're going to get inflammation. And it's going to resonate throughout the entire body, especially the liver, where that's get generate insulin resistance big time.

Number seven, methylation, so epigenetics. There are other things other than methyl groups that can be added on to DNA. But ultimately, once a methyl group goes on, it don't come off. And it changes the expression of those genes, and ultimately of those proteins. And that can result in obesity. It can result in cardiovascular disease. This is a big issue for the metabolism of this bad amino acid called homocysteine, which you need folate to basically destroy, to turn into cystathionine down the line. And

if you have a problem with methylene tetrahydrofolate reductase or MTHFR, you've got a problem. Well one of the ways you can try to goose that is by taking big time folate. But the bottom line is, everyone needs enough folate in order to keep you methylation at a minimum.

And then finally, number eight, the big one that I think is really, really important and has been ignored thus far in the medical literature, autophagy.

Dave:

Yes.

Robert:

So autophagy is garbage night for the cell. So your cells make lots of crap. They make dead mitochondria. They make lipids that become dysfunctional or denatured. They make all sorts of stuff, protein aggregates. And those have to get cleared out. And if they don't get cleared out, ultimately the cell doesn't work right. Now, the time when those get taken care of is often during sleep, especially in the brain. And that is actually what sleep is, it's garbage night for the brain. And so you need your sleep in order to get garbage night.

If you're not doing autophagy you are not keeping your cells healthy. It's like keeping banana peels all over your house and expecting somehow you're not going to slip on one. So getting rid of the junk is essential to having your cells function properly. And the problem is, sugar stops it. Other things in food stop it on a dime. So AMP-kinase is important. A protein called p38a is important. There's a whole host of phenomena going on inside the cell to ubiquitinate the junk and get rid of it. And if you don't do it, you're basically asking for trouble.

The point is that every single one of these subcellular pathologies that I have just mentioned, none of them are druggable. There's no drug for any of them. Not one. You look at the transcription factors, you look at the coactivators, corepressors. You look at the entire molecular mechanism of every single one of those eight subcellular pathologies, none of them have a medicine. None of them are druggable. They're all foodable.

Dave:

Hey, I'm going to take a quick break here. If you're on Clubhouse and listening, this is Dr. Robert Lustig, who just wrote a fantastic new book called *Metabolical*. And he spent about 40 years studying this stuff and is one of the great minds studying aging and metabolism and diseases, and what we can do about it. He doesn't have a Clubhouse account, so I'm piping him through my producer's account so you can hear this episode of *Bulletproof Radio*. But if you want to figure out what's going on, go to Amazon, *Metabolical*. You can find it. And on Upgrade Collective, if you're a member, you should be ordering the book already. This will be in your homework, I'm sure. So definitely read this.

I do have a question from one of the members who typed it to me in Upgrade Collective. Autophagy is at the core of my last book, *Intermittent Fasting Focused*, and he's asking what stage of sleep provides the most autophagy? And I actually don't know the answer to that.

Robert:

I believe, and I am not a sleep expert, but I believe, and I've read I think one paper on this issue, I believe it's stage four sleep.

Dave:

Stage four sleep.

Robert:

So slow wave sleep. It's not REM sleep, that's for sure.

Dave:

Definitely not REM. Yeah.

Robert:

Definitely not REM. Now you need REM, but it's stage four, I'm pretty sure.

Dave:

Yeah. That's when the cerebral spinal fluid should come in through the glymphatic system, wash the brain. And you'd imagine that's when autophagy would happen.

Robert:

That's right.

Dave:

But it could happen right before that, so maybe the waste products are bundled up from lysosome excretions or something. I don't know.

Robert:

So basically what happens when you're sleeping is that the pressure inside your skull goes down. And what that does is it actually causes the tissue of the brain to contract just ever so slightly, which exposes these almost ... I don't even know what to call them. They're called glymphatics. But basically waves of fluid that ultimately surround the brain and start ebbing and tiding. And they carry away all the junk. And that ends up in either the CSF or ultimately in the blood stream. And it is through that mechanism that the brain replenishes itself. Because the brain has no room for junk. There's no place in the brain to store then junk. And also the brain has the most mitochondria. And the mitochondria are working overtime all the time. So they have to be in tip-top shape. And the problem is, mitochondria are easily damaged. And they have to be cleared. The old, defective mitochondria have to be cleared, and you need to make new ones.

And that's actually one of the reasons why exercise is so good, is because it's one of the drivers of new mitochondria, in the brain too.

Dave:

You're painting a really complete picture. So here's what we can do. In your book though you mention a lot of things around what's been done to the food matters more than what's in the food.

Robert:

Indeed.

Dave:

Walk me through your thinking there. I love it and I agree with it. But why?

Robert:

So, what's in the food is what the food industry put into the food. But ultimately what's been done to the food is way more important. Now the empiric data actually supports this. So there is a food classification system that came out of Brazil, by my colleague Carlos Monteiro. And it's called The NOVA System. It doesn't stand for anything. It's the new system, the NOVA system. And what it does is it qualifies the degree of food processing into four categories. So there's class one, class two, class three, class four.

Class one is unprocessed food, basically an apple. Class two is something basically mechanically disrupting, so apple slices if you will or apple sauce. But not the sugar added apple sauce, just put in the Breville if you will. Class three is when stuff's been added to it. So that might be the sweetened apple sauce. And then finally you get to class four, and that's the apple drink. And that bears no relation to anything else. That's where ultra-processed food lives is in that class four, where there are five or more ingredients and ones you've never heard of before, the ones that your grandmother would never recognize as food. And all those mantras that we hear now all the time.

Turns out when you look at consumption data in the UK, in France, now in the United States we even have some data, it's that class four. It's the ultra-processed food category which is associated ... obviously these are epidemiologic studies, so there's only association. But is associated with cancer, with heart disease, with total mortality, et cetera. The class one through three, no signal. It's that class four group that really makes the difference.

So again, it's not what's in the food, it's what's been done to the food. And invariably what's been done to the food is that sugar's been added for palatability, because who don't like sugar. Donkey said it, "Everyone love parfait."

Dave:

There you go.

Robert:

And the removal of fiber, which is basically the hallmark ... Basically, fast food is fiber-less food. And that's on purpose because you can't freeze fiber. And I'll prove it to you. Take an orange, put it in your freezer overnight. Take it out, put it on the counter in the morning. Try to eat it, see what you get. The ice crystals macerate the cell wall, let all the water rush in. Hey, the food industry knows that. So what do they do? Squeeze it and freeze it, lasts forever. Now it's frozen concentrated orange juice. Now it's a commodity. You can trade it on the commodities exchange. Ever see the movie Trading Places?

Dave:

Mm-hmm (affirmative).

Robert:

Frozen, concentrated orange juice, you know Duke and Duke. The point is that that changed food into commodities, is getting rid of fiber. And so that's what the food industry does, because there's money to be made. And the problem is, the fiber was good for us.

Dave:

What do they do with all that fiber? Do they just put it in a dump somewhere?

Robert:

Yeah, they just dump it.

Dave:

That seems like a waste, because pectin's actually good for you.

Robert:

Well it is, but that's what happens.

Dave:

Are you hopeful that big food's going to wake up some day and say, "You know what, we're doing great evil. Maybe we could find a way to put the fiber back in and still make it taste good."

Robert:

It's not just the fiber. It's the whole thing. It's the entire food business paradigm.

Dave:

And to stop adding chemicals and colorings and other crap like that.

Robert:

So there are some food industry people, executives, who they've figured this out, they know. And I've actually talked with one or two of them. They know. The question is what do they do about it. They work for a food company.

Dave:

They're supposed to hire Dr. Ornish to say that carbs are all good for you as long as there's no fat, right?

Robert:

Well, not exactly. Not exactly. But there have been a couple of attempts, within the food industry, to make changes. But they all met with disaster. Indra Nooyi at Pepsi-

Dave:

I've had dinner with her. She's working on fixing ... or she was before she left.

Robert:

She tried.

Dave:

She was working on making it better, for sure.

Robert:

She was trying. She was trying. She always had the fun for you line, the Pepsi and the Doritos. And then she also have the better for you line, like the Slim Jims. And then she made the good for you line, which was the chia seeds and the hummus and the pretzels and stuff like that. And she introduced those in 2006, and by 2011 Wall Street was calling for her head on a silver platter because she'd lost \$349 million in one year. She survived that onslaught, but basically you never heard from the good for you line again after that. Pepsi is now dabbling in trying to recreate and trying to get there.

Another person who tried to do this was Denise Morrison. She was the CEO of Campbell's soup. And so she tried to actually do something about the salt in Campbell's soup, because in the UK, in 2006, action on salt had actually put enough pressure on the Blair government so that the Blair government actually sat down with the entire UK food procurement and service establishment.

So Tesco and Sainsbury and Marks and Spencer, and all those guys, and said, "You are all going to work together to reduce the salt content of the British diet because the incidence of hypertension and stroke is just through the fricking roof. And you all are going to work together and you're all going to reduce the sodium content of all your processed foods by 10% per year, to a maximum of 40% reduction. And you're going to do it over a four year period. And most importantly, we're not going to tell anybody. It's a big secret. No one's going to spill the beans. And you're just going to do it. And we're going to watch and we're going to play referee. And you're going to do it and everyone has to play."

And guess what? They did. And the incidents and prevalence of hypertension and stroke in Britain went down by 30% because they did this. It was a paper that came out in 2012 in the MJ. Wait. So Morrison knew this and said, "Well I'll do this for Campbell's soup," and she didn't last until 2017 because of the fact that sales went down, because she announced it, Special Request Soup. And there she went. She's gone.

Number three, Emmanuel Faber. And he just lost his job a month ago. He was the head of Danone, and they did a full reckoning on their entire portfolio. And they reduced the content of sugar, added sugar, in Danone products by 14%, which to be honest with you, that's not good.

Dave:

That's not a lot.

Robert:

It's like a pittance. But they did it. And Faber is now looking for a job. So there are people in the industry who get it, who know. But they work for a food company.

Dave:

It is a really, really rough situation. I have sat down with similar people, and others, because of my role in creating new ideas in food and all, with my largest company, Bulletproof. And I've had private conversations and every one of them is like, "I want to make food healthier. But if I do something that raises the cost by half a cent, my competitors will sell the stuff that's half a cent cheaper and everyone will keep buying it." It's a race to the cheapest thing. It's almost like the mindset that spending less on food makes you a winner. And certainly I grew up that way. It's like, "Why would I spend more than I have to fill my stomach?" But I don't think that way anymore.

Robert:

I grew up that way too. I grew up that way, exactly the same thing. I ate a lot of Swanson TV dinners. My mother had two jobs. She was a New York City school secretary by day and an agent for my

grandparent's buildings by night. And I had to heat up a lot of Salisbury steaks. And I, when I went to medical school, I was the master of the three second lunch. I didn't know food mattered at all.

And the bottom line is, we should be spending more on food. And people don't understand that. They say that's sacrilege. And the libertarians say we should be able to get it for the cheapest amount possible, et cetera. The countries that spend more of their GDP on food are way healthier than we are. The three worst countries, in terms of percent GDP spent on food, are the U.S., the UK, and Australia. And we are the three with the highest diabetes rate, outside of the Middle East, which has the highest diabetes rate of anybody. And there's lots of reasons for that, because you should see what they're eating.

Dave:

I think also, the Middle East, having dinner way after dark, there's probably a circadian component to that as well, even though it's very traditional and it's kind of nice when you're there. But if you do that for 50 years, that plus a low quality diet, yikes.

Robert:

Yeah. They're eating our food. When they were eating their food it wasn't a problem. But they're eating our food now.

Dave:

So are you hopeful? You've seen this rodeo before. You've been saying this for 40 years. Are we going in the right direction? Is there hope or are we screwed and we're just going to have to take individual responsibility?

Robert:

Well, no. So this whole concept of individual responsibility is a mantra of the food industry. It just doesn't make sense. So personal responsibility has four caveats, and they are not met. So personal responsibility, you have to have knowledge. And right now we don't have the knowledge. I mean, I do. Your listeners do. People who will read this book, they will.

Dave:

Metabolical is the book title, guys on Clubhouse.

Robert:

But the fact of the matter is, the general public just still doesn't know this. And the fact is that the medical establishment, the dietary establishment, the dental establishment, they're still basically peddling the same garbage that they've peddled for the last 50 years. And there are lots of reasons, including the fact that they're paid off to do so.

So you have to have knowledge. And right now we don't have the knowledge. Number two, you have to access.

Dave:

That's the thing.

Robert:

So we talk about food deserts. If you can't get to a radish, how are you supposed to eat it? Ultimately we have to provide access. And that doesn't just mean access in terms of physical access, it means monetary access. So there are things that are not on SNAP, because they're real food. Basically SNAP is all processed food, food stamps, all processed food. And the number one item on SNAP for purchase, soft drinks. Well why do you think that is? That's the sugar subsidy. So we have to dissociate that. I think that the single best thing we could do is get rid of all food subsidies. Let the market do its work. Even the libertarians should be happy with that, because they want government out of our lives in every which way. Well why are they okay with them sponsoring cheap food? So I don't get that. That's a non sequitur for me.

So you have to have knowledge. You have to have access. Affordability. So you have to be able to afford your food. And you have to be able to afford the diseases that the food causes, which we cannot. And then lastly, most importantly, externalities. That is, how does your food consumption affect me. That's what happened with tobacco. So your second hand smoke affected me.

Dave:

That sounds like a mask issue, like you have to eat healthy so that you won't get sick and make me sick, right?

Robert:

Well right. That's right. That's an externality, for sure. The question is, what's the externality for your eating badly? And the answer is, no healthcare. That's the answer.

Dave:

Well first, it makes you act like a jerk, and punch people and have mental issues and stuff like that. And then after you get over your hypoglybitchy, hangry stuff and you don't go to jail because of the brain problems from your bad diet, if you make it that long, your problems come up, right?

Robert:

So I am not going to endorse that.

Dave:

Okay.

Robert:

Okay. Let me just leave it at that.

Dave:

I hear you.

Robert:

I am not going to endorse that, not in public.

Dave:

Very well dodged. You get four stars for that. I'll tell you. When people eat bad food, it does affect their brains and it makes them mean to each other.

Robert:

It does.

Dave:

I think that's real.

Robert:

Well I think that it definitely makes them depressed.

Dave:

There you go.

Robert:

And there's plenty of data on ultra-processed food, insulin resistance, and depression.

Dave:

Yeah.

Robert:

I can talk about addiction. And I can talk about depression. I'm not prepared to talk about anger, violence, disgust, et cetera.

Dave:

Why not?

Robert:

We don't have the data.

Dave:

Interesting.

Robert:

We don't have the data.

Dave:

I've seen some studies around these metabolic diseases, likelihood of going to prison. There's very high correlation there. And some of the people I've talked with even talk about specific pathways. Like Dr. Daniel Amen would probably have something to say about that.

Robert:

Oh, for sure. And I know Daniel very well. And yes, he likely would have something to say. There's one guy who I know, he's in the UK, his name's Bernard Gesch, G-E-S-C-H. He did one study, but it was brilliant. It took him 35 years to do this one study. And what he did was he took British prisoners and he did a randomized, double blind, placebo controlled trial where he gave half the prisoners a multivitamin supplement for a year and the other got control.

Dave:

Yes. I loved this study.

Robert:

And the group that got the multivitamin had a 42% reduction in violent behavior while in prison.

Dave:

Yep, there some association there. And then you get the food colorings and things like that, and some of the flavoring agents that can really be psychoactive in some people, but not everyone.

Robert:

Right. That's right. Some people, but not everyone. So the data is very dilute, so it's very hard to make a case across the board. So I'm all about the science. I am all about the data. You have to prove it to me. As I say in the book, at UCSF we have a motto, "In good we trust. Everyone else has to produce the data." So you got to show me the data. I have the data for addiction. I have the data for depression. But I don't have the data for these other behavioral health disturbances, per se.

We do know that there's an association between sugar beverage consumption and violent behavior in Boston middle schoolers, and also in toddlers, with sugared, sweetened beverage consumption. But again, causation or correlation? We're not there yet.

Dave:

Okay. I can accept that. I'm still going to bet that that correlation is causative. Because I know when I give my kids a bunch of sugar, they sure punch each other. And when I don't, they don't. So there's my N=2 study.

Robert:

I hear you. I hear you.

Dave:

Okay. There was something else on your list that I was surprised wasn't there, this list of things that people need to have. You also need information about what's in your food. And we talked about labeling, but you go to a restaurant, people don't know what all is happening in the food that they think is fresh made that's all processed or ultra-processed food that gets basically reheated and put on a plate. I'm opening my second restaurant, by the way, this month in Victoria B.C. I'm growing the food, that we serve at the restaurant, on my farm. And we don't do ultra-processed. There's no canola oil and corn oil and soybean oil.

But you go to the normal ... even the expensive places that aren't in food deserts and you order the salad, oh it's made with olive oil. And you go, "That's great, because if there's canola oil I'll have a

seizure right here on the table. You'll have to call the medics." And then they come back, go, "Oh my god, I never knew it was half canola in the olive oil in the dressing." I'm like, "Yeah, I knew."

You can't even get what you think you're getting, at most places, because labeling is so bad.

Robert:

Indeed. Labeling is the problem, and that's the point I make in the book is that what you need to know about the food is not on the food label. And so knowing the label is irrelevant. Plus, we actually have the data from New York City after the labeling law in 2009 went into effect, and it didn't change anything that anybody ordered or consumed anyway. So labeling does not work. Education alone has not solved any substance of abuse. Did Nancy Reagan's Just Say No work? We got an opioid crisis, right.

Dave:

I was going to say, I think it actually increased the drug problem.

Robert:

Possibly.

Dave:

Made them cooler for kids.

Robert:

Maybe. The bottom line is that for every societal ill that involves an addictive substance we've had personal intervention, which for lack of a better word we can call rehab. And we have societal intervention, which for lack of a better word we can call laws. Rehab and laws. Rehab and laws. Worked for tobacco. Worked for alcohol. worked for street drugs. Not for prescription opiates, unfortunately. The question is, is sugar a drug? And the answer is, absolutely. Absolutely. It is psychoactive. It causes mitochondrial dysfunction. It is a drug.

But people say, "But it's in food. How can it be a drug?" Well there are a lot of things in food that are drugs. Okay. Caffeine.

Dave:

Caffeine.

Robert:

Yeah, caffeine.

Dave:

It's good for you. ANPK. Come on.

Robert:

Right. Exactly. So the point is we have to rethink how we think about food. We have to rethink how we think about the food system. We have to rethink how we think about the environment. People are mad at the cows. The cows are not the fricking problem.

Dave:
Amen.

Robert:

I actually do the math in the book. If you look at the number of head of cattle today, it is fewer than the number of head of cattle in 1968, 50 years ago.

Dave:
Oops.

Robert:

Okay. There are fewer cattle today than there were then. But we have four times the amount of methane coming from those cattle.

Dave:

It's what the cows eat that's the problem.

Robert:

No, it's not what the cows eat, it's what we did to the cows. It's the antibiotics we gave to the cows which destroyed their gut microbiome and allowed the methanogens to take over so now every cow produces four times the amount of methane than they used to. That's not the fucking cows fault. That's our fault.

Dave:

You know they have a cow probiotic that solves that problem, that's not even expensive.

Robert:

Well I don't know. Is there? I have not seen that.

Dave:

Yeah, no. There is. There's a specially engineered one that reduces methane quite a bit. But of course if you keep giving them antibiotics, there's no point to using it. Which is why my animals eat grass and they don't eat antibiotics. And magically, it's all good.

Robert:

Right. Well the point is, we only need the antibiotics because we put the animal on the CAFO to make meat cheap.

Dave:

Exactly. And plus we kind of need soil. We need poop to make healthy vegetables and all that.

Robert:

Right.

Dave:

So people blaming cows are people who just don't understand systems biology at all, as far as I can tell.

Robert:

That's right. This is a systems biology problem. The thing is that it's an environmental problem, it's an economic problem, and of course it's a public health problem. And we have to solve all of them at the same time. And there's really only one way to solve it, real food. Now, the only people who will be out anything in this are food and pharma. Now, the food industry, they will still make money. It's the pharma that won't. And so they are pushing their pills.

And the thing is, they need to be making acute care medicines, not chronic care medicines. Acute care medicines that will basically solve our problem in a week or less, like good antibiotics that don't develop resistance, as opposed to chronic medicines that you're going to be on for 30 or 40 years, like anti-diabetic or anti-hypertensive drugs. But they basically made their bed. They said, "This is where the money is because this is where the disease is." But we don't need this disease, and it's not treating the disease. It's only treating the symptoms of disease.

Dave:

I know of at least 10 cases where big pharma has bought stuff that would've fixed a disease, just to take it off the market.

Robert:

Yep. That's right.

Dave:

There's great evil being done by these companies, and also some really innovative care. There's some new stuff around anti-cancer treatments that's truly phenomenal. And of course their pricing is usually screwed up. But we all benefit from pharmaceuticals. They're useful when you need them. But the industry is out of control. And they're benefiting from this sick, pollute the environment, feed people crap, get them real sick. And the companies that made big pharma were the original oil companies that became chemical companies that became big pharma companies. So even the oil they're burning that gives us carcinogens eventually makes it back. That seems really hard to fix, Robert. How are we going to fix this?

Robert:

It's a tough one. That's a tough one. In the book I actually describe how the medical establishment moved toward pharma as it's go-to. I talk about John D. Rockefeller. He was the original OG drug kingpin.

Dave:

Really was.

Robert:

And the reason is head of Standard Oil, he had a byproduct that he had heard was good for certain skin diseases.

Dave:

Ah, Vaseline.

Robert:

He had a lot of coal tar. And so he set up the Rockefeller University for Medical Research, where I worked; It is now called the Rockefeller University; back in 1901. And ultimately the goal was to basically rethink medicine by getting coal tar into everything. And he sponsored a lot of medical research, as long as it was on coal tar.

And so this notion that we can solve this problem, better living through pharmacology or chemistry, dates back to the very inception of modern medicine. So the head of the Rockefeller Institute for Medical Research was a guy named Simon Flexner. His brother, Abraham Flexner, was the one who wrote the famous Flexner report that basically shut down 80% of the medical schools in this country at the time, and especially African American medical schools. And to be honest with you, at some point they haven't even recovered from that.

Dave:

That's pretty much like burning the library at ... where was that library? Alexandria. Where we had all these rich, healing traditions that were distributed. They couldn't share that stuff very well. And they just shut it all down and monocropped medicine, which is not a cool thing. And I feel like the diversity's happening again, it's totally growing. Mostly because you can share online. Although, now if you use Google you can't share because they don't show you anything except big pharma.

Robert:

What they want to show you, what they're being paid to show you. Well that's why the subtitle of the book is Learn the Lies of Processed Food, Nutrition, and Modern Medicine. So there's a lot for doctors to take away from this.

Dave:

There is.

Robert:

This is an inherent, systemic problem within the entire medical establishment.

Dave:

You do take on a really unique approach in your book. And if you're on Clubhouse, this is Dr. Robert Lustig. And his new book is just coming out. You can pre-order it right now. And it's called Metabolical. Like diabolical, but Metabolical. Because what you're doing, Robert, is you're saying, "All right, here's the societal, economic, and structural problems that are causing it. Here is what it's doing inside the body. And here's what to do to take care of yourself so it doesn't cause a problem." Most nutrition books-

Robert:

Well, and to take care of society so that we can solve the problem.

Dave:

Yeah. And to solve the problem. Most nutrition books don't talk about the policy angle. I think you and Dr. Hyman are the two leaders. Even my books I don't talk about that too much, just because I feel like it would fill up two more books. You did a fantastic job. This isn't your first potential New York Times best seller. But you've done a really good job of putting enough of these in so that a new reader could sit down and say, "I understand why it's this way." Because it doesn't seem logical on its face. But when you realize it was set up that way, maybe not even intentionally. Maybe it evolved that way. Certainly some people had intention. But I don't think Rockefeller knew in 1901 that his coal tar research was going to result in what it has.

Robert:

Yeah. I often say that this was a plot not a conspiracy. There's a difference.

Dave:

Yeah, big difference.

Robert:

Conspiracy requires collusion between industry actors, in order to make the public sick. I don't think anyone went out to make the public sick. I don't think anybody had that level of sociopathy to say, "I'm going to make people sick." However, they did have the sociopathy of, "I'm going to basically soak these people for all they're worth." It's only about your wallet.

Dave:

That makes a lot of sense. Robert, I am honored to have you on Bulletproof Radio.

Robert:

My pleasure.

Dave:

And I am grateful for your work. And I'm actually a little bit embarrassed that I haven't invited you on before now, because I've been a fan of yours for a very long time. And when I was scheduling this I'm like, "Why have I not interviewed you already?" So apologies for the oversight. You should've been in my first couple hundred guests. And then I should've invited you back. But at least we've got you on now.

Guys, if you heard this on Clubhouse or Upgrade Collective or you're listening to the podcast when we release it, this is a book worth reading. Robert Lustig has done so much work in this book and in his career. There is great wisdom here, if you couldn't tell from the interview. Very well structured. Very readable. And he's just a fantastic researcher who has really moved our thinking about how to eat. So thank you for your work. Enjoy your haircut. Thanks for being on Bulletproof Radio.

Robert:

My pleasure, David. Thank you for having me. It's been my pleasure. Any time.

Dave:

If you liked today's episode, you know what to do. Share it with a friend. And definitely order the book. And if you follow me on Clubhouse, I am Dave Asprey. Pretty easy to find on there. And if you don't know about the Upgrade Collective go to ourupgradecollective.com. I will teach you all of my books, in a

large, vibrant community. You get access to be a live studio audience on video, see the behind the scenes stuff and all of that, and a whole team answering all of your questions about Bulletproof Diet and everything else in between. Ourupgradecollective.com. Hope I see you on there.