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# The Brain on Fat

Mark Hyman, MD with David Perlmutter MD, FACN, ABIHM

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**Dr. Hyman:** Hey everyone, it's Dr. Mark Hyman. I'm here with my close friend and colleague, Dr. David Perlmutter, who I've known for over 20 years. And he's honestly been one of my mentors and teachers, who I've studied and learned from.

I remember his first book, "BrainRecovery.com." I devoured it; I used it with my patients, saw extraordinary results. And then he wrote "The Better Brain Book," which is a fantastic book that I also devoured. And "Grain Brain," you've all heard of, it's the number one New York Times best seller, been on the list for over a year. And his new book, "Brain Maker," is an astounding look at the brain and the gut and there's so much we can talk about that.

And he's just an amazing man who's got a brilliant mind, a great heart, and has really explored the edges of science and the brain and how those two things intersect, to give us a story about why we get sick and how we get better, in ways that we never imagined. And I think there's no person on the planet today that has more of a breadth of understanding of the brain, it's functioning, in terms of aging, Alzheimer's, Parkinson's, cognitive function, and how it relates to our diet, environment, and this wonderful world of fat, which we're talking about on the Fat Summit that you're all joining us on today.

So Dr. Perlmutter, I know you've also been on the Dr. Oz show many times, and I think we've played on there together a few times. So I think it's really great to have you, I'm a huge fan, and I really appreciate you joining us. So I wanted to start right out by...you want to say something?

**Dr. Perlmutter:** I was going to say hi, Mark...

**Dr. Hyman:** Hi.

**Dr. Perlmutter:**...and I'm glad I'm here, and I did say that, there you go.

**Dr. Hyman:** Yeah. So Dave and I have known each other forever. In fact, when I was sick with chronic fatigue syndrome, I called David and asked for his help, and he was so generous and kind. And it's just been amazing to be on this journey together, pushing functional medicine forward in the world.

So I want to just start off by saying that I recently read the "Grain Brain," and as I was researching for my book, "Eat Fat, Get Thin," I was very curious about how you frame the story of the brain and fat. Because I learned from you many years ago that 60% of our brain is made up of fat, and most of its omega-3 fats that, if we don't have fat, our brains can't work better. And that all our cells are made of fat, that our nerve sheaths are made of fat, and that it's really a critical area to be focused on, in terms of the fat we eat and the fat in our bodies and

how it all connects.

But what really struck me in part of the "Grain Brain" was that you were advocating a very high-fat diet for the brain. And I'd love for you to share the story of how you came to this, how you learned this, and what the science is behind it, in fact, what kind of results you've seen with your patients around it.

**Dr. Perlmutter:** Well, it's a big challenge.

**Dr. Hyman:** Yes, but we have an hour.

**Dr. Perlmutter:** Let me start by saying how did I really arrive at the notion that fat was good for the body. And one of your statistics, earlier, about 60% to 70% of the brain being made of fat, that was an eye-opening experience for me, especially when you qualify that afterwards and said and that fat comes from the food that we eat. When I realized that, I started to wonder...this was many years ago... about the real substance behind the notion that we should all be on a low-fat or no-fat diet, which as many of the viewers of this interview I'm sure recall, that was the party line for many, many years. You'd walk down the grocery store aisle, and it was littered with low-fat and no-fat, high-carbohydrate cookies, cakes, you name it. And these were the years when the Dr. Ornish diet was very popular for ostensibly being good for the heart and even reversing heart disease. And by extension, if it was good for

the heart, it was thought to be good for the rest of the body.

And when you take a step back and you recognize, first of all, that humans have always consumed fat. Fat is a very dense source of vital calories, and the fact that we've always had access to fatty foods throughout our two million-plus years on this planet has really allowed us to survive. Now, when we put this in the context of the fact that our food is more than protein, carbohydrates, and fat in terms of the macronutrients...and the micronutrients being minerals and vitamins...in terms of just the raw substances of the food, that's all interesting and we'll certainly talk about that. But as you and I learned many years ago, under the tutelage of Dr. Jeffrey Bland, food is information. Food is actually interacting with our genome, with our 23,000 genes that we've been so gratified to understand in recent years, and been able to sequence. So food, the very food that we eat, interacts with our genome.

When you look at it in that context, you recognize that our genes, our code of life, has evolved to work in concert with these signals that it's getting from food. And that said, we've had a lot of good fat in our diets until just a few moments ago, when researchers like Dr. Ancel Keys made their way to influence policy in Washington, and suddenly it was decided that fat, which had been part of the human diet since we've walked this planet, was a bad thing, and in place of fat...

**Dr. Hyman:** It's actually what the indigenous populations prefer, right? They would break the bone marrow open and suck out the bone marrow when they killed an animal...

**Dr. Perlmutter:** Absolutely.

**Dr. Hyman:**...and eat the organs, where all the fat was, right?

**Dr. Perlmutter:** And we all basically crave fat. And we love that unctuous sense of fat. The Veda texts talk about that as being so soothing, and the anti-inflammatory, I might add. But that said it was looked upon as being something that the United States Department of Agriculture could get involved in. They jumped on the bandwagon. And right away, the doctrine was that to be healthy, you had to be on a low-fat, no-fat diet. And in its place, by default, what did we do? We increased...

**Dr. Hyman:** Ate sugar,

**Dr. Perlmutter:**...our consumption of carbs, sugar and carbohydrates. And I don't think there's a reasonable researcher or scientist around today who would argue the fact that this influx of carbohydrates... and particularly the simple monosaccharides, or sugars...into our diet, has been our undoing. There are strong correlative studies with respect to sugar consumption and higher carbohydrate diets raising blood sugar, and the relationships of higher blood sugar to virtually every bad thing you don't want to get, whether it's heart disease, cancer, my interest being Alzheimer's, etc...

**Dr. Hyman:** I mean, don't they call Alzheimer's now type 3 diabetes, right, David?

**Dr. Perlmutter:** Exactly. We recognize a very distinct relationship between even subtle elevations of blood sugar and risk for dementia, as was so eloquently published in September of 2013 in the "New England Journal of Medicine," in which they took several thousand, up to 6,000 individuals without dementia. They performed one laboratory study on these individuals. They simply

measured their blood sugar. That's it. Then they followed them for about 6.7 years, and they asked the question, who got dementia and who didn't? And lo and behold, there was a linear increased risk of dementia that correlated very nicely with blood sugar. And the scary but empowering part of the data demonstrated significant increased risk of becoming a demented person with an original blood sugar of 105 and 110.

**Dr. Hyman:** Yeah, not even diabetes, right.

**Dr. Perlmutter:** No, not even diabetes.

**Dr. Hyman:** Well, isn't it true that if you're diabetic, you have four times the risk of Alzheimer's?

**Dr. Perlmutter:** It is now...in my books, I would say doubled, but a recent study that came out in the journal "Archives of Neurology" actually puts that figure closer to fourfold increased risk for a disease for which there is no treatment. So it is absolutely...

**Dr. Hyman:** I want to talk to you about that, because I think it is true that there is no treatment? And I had a patient recently, who had early dementia, and using functional medicine, we helped improve her cognitive function dramatically, and then after about five years, she slipped a little bit. And I put her on an extremely high-fat diet, like 70% fat, because I'd read about it in your work and I read about it in other journals. And I was like, well, there's nothing to lose by doing this. And it was remarkable. It's like she woke up, like Rip van Winkle. And I've also seen this on the other end of the spectrum, with autistic kids, who are...

**Dr. Perlmutter:** Yes



**Dr. Hyman:**...who are violent and struggling and cognitive-impaired. And we put them on extremely low glycemic, very high-fat diets, and they kind of wake up. It's pretty amazing. So how does that happen? And can we both prevent and reverse this by changing the kinds of fat we eat? And what should we be eating?

**Dr. Perlmutter:** Answer to the first question is absolutely. We can do lots of great things to prevent senile dementia of the Alzheimer's type. And when I stated earlier there is no treatment for Alzheimer's, what I mean by that is there is no prescription pad, mono-drug therapy that has any effectiveness whatsoever, despite the fact that these cholinesterase inhibiting drugs are over a \$1 billion expenditure in terms of treating Alzheimer's patients. Think about that.

And the drugs do not work.

**Dr. Hyman:** Yeah. David, I heard recently there's like we've spent \$2 billion over the last couple of decades and with 243 studies, and all of them have failed except for 1, which extended people's time before they went into the nursing home by 3 months or something. It was just...

**Dr. Perlmutter:** Yeah, and a mess.

**Dr. Hyman:** It's a massive failure.

**Dr. Perlmutter:** But we can't prevent it. It's been published in "The Lancet" by Dr. Deborah Barnes, University of California San Francisco. And let me just talk to you for a moment about treatment. And again, when I say there's no treatment, there's no one single approach. Here we are, in medicine, in Western cultures, and we are really very used to treating a single disease with a single, what we call a monotherapy, one drug, one disease. You have high blood

pressure, here's your drug, go home. That's not going to work in Alzheimer's, because Alzheimer's is the culmination of multiple factors that ultimately conspire and lead brain cells to basically commit suicide. So we have dropout of cells in the memory center of the brain and the frontal areas of the brain, and that leads to the classic symptomatology that we see in Alzheimer's. Lately I've been working with a Dr. Dale Bredesen, who runs the Alzheimer's research department at UCLA, but is also the president and CEO of what's called The Buck Institute, which is just about 40 miles north of San Francisco. And I visited him several months ago, and we did an evening presentation and reviewed what does the future of Alzheimer's treatment look like, recognizing that in September of 2014 in the journal "Aging," Dr. Bredesen published his first 10 cases in which he reversed Alzheimer's disease in 9 of 10.

Now, no one's going to write home about 9 out of 10 patients, making a big deal about it, but I sure as heck am, because it's the first time there's been published research in a peer-reviewed journal demonstrating people getting back to their lives and going back to work. And what Dr. Bredesen did was he employed a changing 36 different interventions, 36 different parameters were modified. Normalizing homocysteine, regaining aerobic exercise, getting on a diet that's higher in fat and much lower in carbohydrate, working with hormones, the importance of the aerobic exercise to increase the growth of new brain cells, multiple dietary approaches to reduce inflammation. Thirty-six points of intervention, that's what it's going to take, and he was hugely successful. And interestingly enough, if you read online about it, people are so critical, saying oh, he threw the kitchen sink at people, and that's how he made it happen. I don't care. Count me in.

**Dr. Hyman:** No, no, he told me actually how he kind of came up with all this, because he had this patient who came to him, he was a researcher, not really a clinician.

**Dr. Perlmutter:** Exactly.

**Dr. Hyman:** And his wife was into functional medicine, and she read my book, "UltraMind Solution," and this patient came to him with early dementia at 60, not remembering where she was going, couldn't function at work anymore. And he said well, gee, try this approach, because it seems like it makes sense. So a year later she comes back, completely better. Cognitively better, neurocognitive testing better, gone, symptoms. So he was like what's going on here? And he realized that it's a multi-factorial, multidimensional problem...

**Dr. Perlmutter:** Exactly, multiple event.

**Dr. Hyman:** It has multiple processes, it needs multiple interventions. And what he told me was fascinating. He said, "You know, Mark, I tried to fund a research program on this, and the donor was giving me \$2 million, but the researcher review board said, 'Well, if you have people sleep better and eat well and exercise and take supplements and do all the right things, how do we know what worked? So we're not going to actually approve the study.'" So it's the opposite of what we need to be doing...

**Dr. Perlmutter:** It is.

**Dr. Hyman:**...which is thinking about systems approaches. And actually, I'm...

**Dr. Perlmutter:** We are locked into that mentality, unfortunately, in America, and in Western culture, is that we need one magic pill to fix a disease, be it Alzheimer's or

cardiovascular issues; we need a single magic pill. Because that can be monetized. It's proprietary and you can market it to doctors and patients alike, and that's how it works. And here Dr. Bredesen, doing the best he can get funding, has reversed Alzheimer's in 90%, although it's a small number of individuals.

**Dr. Hyman:** Yeah. We're working on collaborating with the folks out here.

**Dr. Perlmutter:** I will tell you that the fundamentals, from a dietary perspective, of what he's talking about, are exactly what you and I are now talking about, being a low carbohydrate diet and a higher fat, gluten free—we'll get there in a bit... gluten free approach. Now why higher fat?

**Dr. Hyman:** Yeah, let's dig into that, because that's what this is about. This is the Fat Summit, so tell me about fat.

**Dr. Perlmutter:** Absolutely. People just freak out. You're giving people fat, fat will make your kids born naked or some horrible thing happen. So again, the brain...

**Dr. Hyman:** I think that's what's supposed to happen, actually, David. They're supposed to be born naked.

**Dr. Perlmutter:** Oh, really. I didn't know. So...

**Dr. Hyman:** Did yours come in with clothes on?

**Dr. Perlmutter:** We all were told that the brain has to have glucose, that's why we've got to eat sugar and carbs, we've got to fuel the brain. That is bunk.

**Dr. Hyman:** Yeah. Yeah, that's what I learned in medical school, that the only fuel the brain can use is glucose.

**Dr. Perlmutter:** That's right. And then along comes researchers like Mark Mattson, who demonstrate that the brain is very, very keto-adaptable, meaning it's very able to use ketones, a form of fat as a fuel. And not only just able to, but when the brain is burning fat as opposed to carbs for fuel, it does so far more efficiently, creates far more of what's called ATP, or energy molecules, and does so without creating as many what are called free radicals, damaging exhaust, if you will, from what would normally have been present if you're burning sugar. That's what the brain loves to burn. And you can achieve that by cutting out your carbs and by reintroducing wonderful, good, healthful fats. We'll talk about that a little bit later.

Now, let me tell you how far this has come. A company has actually created a product that they market now to treat Alzheimer's, to augment the treatment of Alzheimer's. It's basically making them more ketotic, more fat-burning, and they're able to sell this product. Which, I tell my patients, look; all you got to do is cut your carbs and take a couple tablespoons of coconut oil every day. You're going to give yourself the raw material to make those ketones that your brain will thank you for, and that's how you see improvements in people.

You normalize their Vitamin Ds. You drive their homocysteine levels down. You make sure that they're exercising. These are things that we've talked about, in my lectures, in my past couple of books. My public television programs have been all about this, and how exciting it is that the peer-reviewed, well-respected research is validating the underpinnings of exactly what we're doing.

**Dr. Hyman:** It takes so long, right, so for doctors and medical system to change...

**Dr. Perlmutter:** That's all right.

**Dr. Hyman:**...we're still so stuck on the low-fat message. Cardiologists are still recommending low-fat diets, the American Diabetic Association. But what's really striking, I don't know if you saw the U.S. Dietary Guidelines Committee, which is the committee that makes our food policy in America. They recommend to the government what we should be doing and the government usually listens. And this advisory group, for the first time in 40 years, said hey guys, we don't need to worry about fat any more.

We shouldn't restrict the amount of fat, we shouldn't worry about it in terms of heart disease, and we shouldn't worry about it in terms of weight. And even more striking, they said by the way, cholesterol, you know, that thing we're all supposed to avoid and eat egg white omelets that are gross and tasteless? Guess what? You can eat them again, because cholesterol "is not a nutrient of concern." Right? And that's...

**Dr. Perlmutter:** That's right.

**Dr. Hyman:** And I'm like whoa, not a nutrient of concern. Like that's such an unceremonious death for this horrible thing that we've all been afraid of.

**Dr. Perlmutter:** Really. How late did it take these guys to jump on the band-wagon? But understand, this was a governmental advisory committee, but they really had to go against the grain, pun absolutely intended on that one, when they issued this 700-page document indicating that what's killing Americans is the sugar and carbs, it's not the fat. But I certainly don't want to leave the viewers of this summit with the notion that you and I are saying hey, bring on all fats, they're all good. Because obviously, we've got to be real

specific in terms of the types of fat that people are going to walk out of this seminar thinking they should be eating. And I think we really want to remember to do that.

**Dr. Hyman:** Well, it's a couple things I want to address. One is the carb issue that you mentioned, and two is what fats are good, what fats are bad, and are there problems we should be worried about with eating too much fat? So the carb issue, I always say all plants are carbs, right, so lettuce is a carb. Spinach is a carb. Broccoli is a carb. But so is pasta or bread.

So we have to think about the different quality of the carb we're eating, because we probably want actually most of our volume of food to be carbs, right, plant foods, vegetables, right? But by calories, probably more like 50% to 60% fat. So it's sort of a way of flipping like on your plate, the size of the amount of vegetables you want is mostly vegetables, protein...not too much, because that turns into sugar, right...and then fat.

**Dr. Perlmutter:** Exactly. And not to get too technical with your viewers, but understand that gram per gram, there's more than twice as much calories in fats in comparison to carbohydrates. So therefore, just in terms of if you had equal amounts of calories; you would have twice as much food on your plate in terms of mass of those carbohydrates. And you make a good point. That those vegetables, and to a lesser extent, fruit, that we want people to eat, are, in fact, carbohydrate, and we have to qualify that. So we tell people 60 to 80 grams of total carbs a day is not unreasonable. That's not draconian. But these are exactly the carbohydrates that you're talking about. They are fiber-rich, nutrient-dense vegetables that act as...we'll get there...as prebiotic fiber to nurture the good gut bacteria. So we want people to load their plates.

Most of the plate should really be colorful, nutrient-dense vegetables. Now if you are a non-vegetarian, then you can have some protein, animal-based protein, if you so choose.

But I think you've got to be real specific about that. If you're eating grain-fed beef, then you are eating a lot of stuff that may surprise you. You're eating the wrong kind of fat. You're eating the pro-inflammatory omega-6. You're also dousing your body with antibiotics and likely hormones as well from food that's been fed genetically modified types of feed.

**Dr. Hyman:** So it's not only what you eat, it's what you are eating just ate.

**Dr. Perlmutter:** Exactly.

**Dr. Hyman:** Right.

**Dr. Perlmutter:** But the real issue is to make people comfortable in terms of dousing their foods with extra-virgin organic olive oil. It's pure fat. Eating coconut oil, that's more than 90%, dreaded saturated fat.

**Dr. Hyman:** Oh my God, we have to talk about that in a minute.

**Dr. Perlmutter:** Yes. When do you want to talk about it?

**Dr. Hyman:** Well, saturated fat and coconut oil, and these are things that we were all told were horrible, right? So now we're saying eat olive oil, eat coconut oil, and eat grass-fed butter. Like what's up? Because if saturated fat was the boogeyman, and you brought this up in your book that I read, "Better Brain Book," that we should be watching cholesterol in our diet, that we should be lowering saturated fat, having good fats, but watching the bad fats, and trans fat are bad fats and saturated fats are bad fats.

And I recommend the same thing. If you look back at my book, "UltraMetabolism," that I wrote 10 years ago, that was a story that we all believed. And somehow most of us in this space have changed our thinking. And maybe you could share some of the research and thinking that's really guided your flip-flop from saturated fats bad to saturated fats good.

**Dr. Perlmutter:** Well, let's just say flip, because I haven't flopped back.

**Dr. Hyman:** Okay, your flip.

David: No, the argument in favor of us now, in terms of the position that we've taken, is really that we're now in line with the entire history of humans. And I think that's very powerful. When you get back to my original comment about honoring this relationship between our food and our genetic expression. That when we start to load up with carbohydrates and sugars, we actually change our gene expression. We're altering the expression of our life plan, and that's scary business. So we finally, I think, have gotten it right.

And recently on the Internet, a fellow was criticizing me, saying well; Dr. Perlmutter told us 11 years ago that we shouldn't eat foods high in cholesterol and saturated fat. I did say that, I'm the first to admit it. And I haven't flip-flopped. I am doing the very best I can to stay on top of the most aggressive, leading-edge research in this area. And I think what you and I are now seeing is this incredible convergence from all spheres, coming in on the notion that fat is really where it's at, that we need more fat. The United States Dietary Advisory Committee, as you mentioned earlier, they're not exactly avant-garde, and they're telling us hey, go for it, we need fat.

And as you mentioned earlier, every cell in your body is desperate for

fat. It comes from the food that we eat. So having said that, we were told that you've got to avoid saturated fat or the roof is going to cave in or some horrible thing will happen. And now we recognize that in fact saturated fat has wonderful qualities indeed. The fact that it is as highly saturated as it is...for example, coconut oil...by definition means that it is highly resistant to being damaged by free radicals. It's very difficult to oxidize, or rust, if you will. And when you recognize that 50%...

**Dr. Hyman:** Sort of like corn oil will go rancid, whereas butter might not go rancid as fast, right?

**Dr. Perlmutter:** Exactly right. And 50% of all the fat that's found in human breast milk is saturated fat. So all these years of castigating...

**Dr. Hyman:** Imagine that, right?

**Dr. Perlmutter:** I know. Castigation of saturated fat means that either Mother Nature got it wrong or God got it wrong, however you want to respond to that, and I tend to think otherwise. The brain especially has significant requirements for saturated fat in various parts of its construction. So when the...

**Dr. Hyman:** So there's a lot of saturated fat in the brain, and that's a good thing?

**Dr. Perlmutter:** Yes, it's a very good thing. Again, resistant to being damaged by free radicals. The "Annals of Internal Medicine," as you will know, in the spring of last year published an extensive meta-analysis demonstrating... and this is a review of over 500,000 individuals...no increased risk of coronary artery events in those individuals eating the highest level of the dreaded saturated fat.

**Dr. Hyman:** So how do you then kind of correlate that with the

observation that gee, that people seem to have higher cholesterol have higher heart disease and saturated fat increases your cholesterol? How do you kind of reconcile that in your mind?

**Dr. Perlmutter:** Well, I think that what does seem to make sense is that when you look at the correlative studies that demonstrate particularly the correlation of higher levels of LDL or so-called bad cholesterol...I hate the name, because there's nothing bad about it...and heart disease, I think those studies indicate the correlation, because the more LDL that you have, the more likely you are to oxidize your LDL, and that means damage it with free radicals. And it's the oxidized LDL that is the troublemaker, which leads to the collection of the atheroma, that which narrows the inflammatory response, which narrows the arteries and leads to problems.

So let's just take that apart a little bit. So it's the oxidized LDL that is the troublemaker, which would obviously correlate with higher levels of raw LDL as well. So... We know that there's a very strong, almost direct correlation between levels of oxidized LDL and levels of what's called glycated LDL. That means LDL, which is a protein, bound to sugar. So we correlate...

**Dr. Hyman:** So it's like when the sugars and the proteins get together, it's like crême brûlée, right, that little crispy stuff on top or a crispy dark skin...

**Dr. Perlmutter:** Exactly right and basically finds it. So we see this great correlation, then, between the dreaded oxidized LDL...which laboratories are now able to measure for patients, which I think is very valuable...a correlation between oxidized LDL and glycated LDL. Now ...

**Dr. Hyman:** I saw that recently, David, on a LabCorp result that I had not seen before, that now they're actually measuring oxidized LDL.

**Dr. Perlmutter:** As they should. But here's an even easier way of looking at that, and it's a bit of an inference. But there's a very direct correlation between levels of glycated LDL and hemoglobin A1C, which is a lab test that a lot of people get, or at least should, even if you're not diabetic.

**Dr. Hyman:** Well, see that, that's a good point, David. Most doctors will not test your hemoglobin A1C, which is a measure of your average blood sugar over six weeks, unless you've already been diagnosed with diabetes.

**Dr. Perlmutter:** Oh, I know.

**Dr. Hyman:** And rarely do they do it as a screening test, and they certainly don't do it in people who are relatively healthy, because they don't think it matters. But as we know, if you have a level of over 5.5%, your risk starts to go up. So I think it's important, it's one of the most important screening tests that I do in my practice, and I've written a lot about it.

**Dr. Perlmutter:** Exactly. And we should spend a little time on this, because I think it's really valuable information. So we've gone from oxidized LDL to glycated LDL correlating with A1C. So many of your patients have had their A1C levels, and as you well point out, they'll be told, oh, I've got a hemoglobin A1C level of 5.8, 5.9, they're not diabetic, they get a pat on the back and say hey, you're not diabetic, don't worry about it. From my perspective, when I see data that demonstrates that at a hemoglobin A1C level of 5.6, 5.7, 5.8, you are already in the range that predicts significant increased risk of brain shrinkage on MRI scans



on an annual basis, correlating quite well with elevation of your A1C that becomes really...

**Dr. Hyman:** So how does that work, you have a big belly, small brain, right?

**Dr. Perlmutter:** Big belly, small brain, and small other things, for your males, as well. So that said, the A1C test that you well pointed out is only done if you're already diabetic, which is pathetic, is a powerful marker indicating to you the rate at which your brain is degenerating. Now here's the take-home message. If you want to lower your A1C, eat more fat and less carbs. It's really that simple.

**Dr. Hyman:** It really is.

**Dr. Perlmutter:** The less carbs you ingest, the less sugar you ingest, the lower is your blood sugar, and the less you'll have that process of glycation, which changes your hemoglobin and glycates it, and the less your brain will shrink.

**Dr. Hyman:** All these doctors recommending statins to lower cholesterol, and you wrote a lot about that in your book. And we're very concerned about it, because it affects the brain. And I have a neurosurgeon who I'm close with at Cleveland Clinic who said to me, "Mark, I'm scared of statins, because I'm a neurosurgeon, I know what the brain's made of, I know what nerves are made of, and they need cholesterol to construct the raw materials of those substances in our body. And what happens if we don't have it? I don't want to take a statin," he said.

**Dr. Perlmutter:** Well, his intuition is absolutely dialed in. Just like the war on fat, the war on cholesterol is ridiculous. Humans have been consuming and manufacturing in their bodies cholesterol for as long as we've been here. The body

makes lots of cholesterol. And does that mean it's making a terrible mistake? No, that's nonsense. We need cholesterol. Cholesterol is a...

**Dr. Hyman:** So how does that sync up with the studies that show that there's an increased risk of heart disease? Because the cardiologists are all talking about it, and they talk about the risk reduction with statins, and they sort of have huge amounts of data, and it's billions of dollars they've spent researching it, and they're all pretty convinced. So we're going kind of against the grain here, so to speak, right?

**Dr. Perlmutter:** Story of my life. Yes, we are, in fact. And I think the story is one that the relationships between raw values of total cholesterol and cardiac risk are fairly insignificant. When you look at bigger pictures like oxidized LDL, glycated LDL, then look at total cholesterol, and try to stratify that data by taking the sugar markers, the glucose markers, out, you'll still see a correlation. But in a simulation, it's important...

**Dr. Hyman:** If you have normal sugar and no oxidized LDL, then the risk even is not there if they have a high LDL is what you're saying, so.

**Dr. Perlmutter:** That's what I'm saying. That's why we call those stratified studies. And I think we have to look at these studies in light of the data that's peer reviewed, published in well-respected journals, that indicates a substantial increased risk of dementia in elderly people with the lowest cholesterol. Increased risk, dramatically increased risk of dementia, as well as depression, in those elderly individuals with the lowest cholesterol. So cholesterol is our friend. We must embrace cholesterol, we must love it.

Cholesterol is what the body uses to make estrogen, progesterone,

cortisol, Vitamin D, for crying out loud. It's a critical, fundamental building block of every cell membrane, including brain cells. And in the brain, it acts as an antioxidant. So the war on cholesterol is ill founded, as was well described by one of the original researchers from the Framingham study, where the data was harvested to make these ridiculous claims that tell everybody they should be taking statin drugs. Just to beat the dead horse here, we now talk about "statin brain," about people who take statins and...

**Dr. Hyman:** What's the evidence for that? I think I've read conflicting reports saying oh, it's overblown, or other people say no, it's real.

**Dr. Perlmutter:** Well, let me tell you how deep the evidence is. It's deep enough and real enough that the FDA has now required a warning label on statin drugs to indicate that these drugs can affect memory. That's how real the data is.

**Dr. Hyman:** I see. So basically, you pick your organ. You want your heart or your brain, right? It seems like...I think why not pick both?

**Dr. Perlmutter:** Well, I think it brings up a very good point, Mark, and that is what a preposterous notion it would be, or it is, in some people's minds, that there is a heart-smart diet that's different from a cancer-prevention diet that's different from a diabetes-prevention diet that's different from a weight-loss diet. That doesn't make any sense, like you're saying. You're going to pick your illness? Absolutely not.

**Dr. Hyman:** That's one of the things I heard you say, David, once that just was like a brilliant moment of yours, that I heard you on stage. You say well, it's crazy. There's one human diet that works, right? It works for everything. It's not just

one diet for cancer and one diet for diabetes and one diet...and you're kind of screwed, if you picked the wrong diet, then you're going to get something else. It's like choose your poison.

**Dr. Perlmutter:** We need a diet that is going to reduce inflammation, the cornerstone of all body degenerative issues that caters to our microbiome that caters to our immune function. And that is a diet that is lower in carbs, lower in sugar, higher in fat, and very high in prebiotic fiber to nurture the gut bacteria. Those are the keys.

**Dr. Hyman:** I want to sort of address one little, subtle point here, because I think, and I've been reading about studies that show that saturated fat causes inflammation, right? And I think that I saw one, for example, the other day where they looked at animals and they induced high saturated fats in their blood, and that led to tremendous amounts of inflammation. And what the researchers said but they were wrong, which is that saturated fat in your diet is what causes high saturated fat in your blood. It seems like its common sense, but the science is actually quite different.

What drives high levels of saturated fat in your blood is actually sugar and carbs, and it's through this chemical process that happens in the liver, called lipogenesis, which means the genesis of new fats. You build new fats from carbs. When you eat saturated fat, it doesn't actually cause your blood levels of saturated fat to go up. So this whole kind of notion of saturated fat inflammation is fascinating to me, and I think it hasn't been adequately answered. And one of the things that it seems to be interesting around this is that saturated fat in your diet can cause inflammation under two conditions. One is lots of sugar and refined carbs...

**Dr. Perlmutter:** Exactly right.

**Dr. Hyman:**...and two is not enough omega-3 fats. Because if you don't have enough omega-3 fats...

**Dr. Perlmutter:** And three is going to be when there is an imbalance of the gut bacteria.

**Dr. Hyman:** Absolutely. Right. Yeah.

**Dr. Perlmutter:** Let me get back to one other point. I don't want to leave it hanging, a hanging chad, I'm in Florida. And that is, in our discussion of LDL, and I just want to emphasize that LDL is not bad anything. Without LDL you couldn't survive, so why call it bad? Whoever came up with that, whatever Don Draper developed the notion that LDL is bad cholesterol, A, it's not cholesterol, B, it's not bad.

But understand that LDL is a carrier of protein, lipoprotein, and it actually in the brain has a critically fundamental role in terms of delivering nutrients across from the blood vessels into brain cells. When LDL is glycated, its ability to translate that activity, to provide fuel and nutrients to brain cells, is compromised. So the notion of lowering the LDL to levels that are, lower is better, is so wrong...

**Dr. Hyman:** It's frightening. It's frightening.

**Dr. Perlmutter:**...it's bad for the brain; it's bad for the heart. We've got to...

**Dr. Hyman:** There are these new drugs that were approved, David, that were being boasted about, that could drive LDL into the single digits. And my heart's skipping a beat. I'm like that is frightening.

**Dr. Perlmutter:** Well, it is frightening, especially for the first time in history, when you recognize that these injectable forms of

cholesterol-lowering drugs have never been demonstrated to have any clinical benefit, because the studies have not yet been completed. The clinical trials on the studies haven't even been completed, and yet the drug has been approved because it...

**Dr. Hyman:** Lowers LDL.

**Dr. Perlmutter:**...lowers cholesterol. And cholesterol is fat.

**Dr. Hyman:** Right, right, right. So lowering LDL doesn't necessarily correlate to reducing a heart attack risk, right?

**Dr. Perlmutter:** Wow, that's true.

**Dr. Hyman:** It's a surrogate marker. It's like just, they haven't proved it. It's pretty scary, actually, and I think I encourage anybody who's really interested in this issue of statins, cholesterol, fat, you do a great job of explaining it in "*Grain Brain*," I thought it was brilliant. And you really broke it down for people. I went through some of the research that just sort of turns upside down our notions of fat.

I want to now spend a few minutes talking about your new book, which is really stunning. And it's sort of a weird idea that a neurologist would be worried about poop. Right? Shouldn't you be a gastroenterologist if you're studying the gut, and what are you doing in this space? And I just want to tell you a little anecdote that you're going to find amazing, and I don't even know if you know this fact. But there's a researcher named Rudy Tanzi, who's at Harvard, who's a brilliant Alzheimer's researcher, he discovered some of the presenilin genes. He's just an amazing guy who's one of the leading thinkers in Alzheimer's today.

And he was jumping up and down like a little boy, explaining to me

how they discovered that the reason that you get these plaques and tangles in the brain, the plaques that cause Alzheimer's, is because there's something that triggers inflammation. And what they're discovering is that the seed that is actually starting inflammation is what he calls the brain microbiome, that there's actually viruses and yeast and bacteria, and a lot of these things are connected to what's going on in the gut, and it's actually driving Alzheimer's. Which I think is so...

**Dr. Perlmutter:** That's right.

**Dr. Hyman:**...fascinating. And I remember I have a patient who had Alzheimer's. He had high levels of mercury, for sure, but he also he had horrible gut issues forever. And we fixed his gut, changed his flora, and his brain woke up. It was just a fascinating case study. But I'd love you to comment on this, because it's just so interesting and the microbiome of the brain...

**Dr. Perlmutter:** Well, you brought up a lot of points. And first of all, there are, and ongoing, and have been published studies looking at techniques, pharmaceutical ways of getting rid of the beta-amyloid plaque in the brain, in hopes of affecting the course of Alzheimer's disease. And these trials have all failed. They have made people worse. So you can't just keep going down that corridor and bumping your head on a closed door and saying it's going to open someday. No, you're wrong.

And what Dr. Tanzi and others have talked about is looking at this amyloid not as the cause but as an effect, as something, as a response. And we've known for well over a decade that amyloid plaque is what is called an antimicrobial peptide, or AMP. Meaning that it actually helps cleanse the brain and may actually be forming in the brain in response

to something. There's a researcher in England, Dr. Ruth Itzhaki. And what Dr. Ruth Itzhaki has noted is that there is a strong correlation in terms of risk for Alzheimer's correlating with antibodies to herpes simplex virus. And that this whole story then comes together, that when the brain is populated by HSV, herpes simplex virus, the first thing that happens is the brain mounts its defense and forms antimicrobial peptides to get rid of...

**Dr. Hyman:** It's like you're having a cold sore in the brain, right, basically?

**Dr. Perlmutter:** Exactly right, same virus. And so that might well be what this amyloid plaque is all about. Now, researchers have developed imaging...

**Dr. Hyman:** He was saying they found bacteria, they found yeast; they found all this crazy stuff.

**Dr. Perlmutter:** Oh yeah. And also in the uterus. We've been thinking for years that, well, babies acquire their entire microbiome at the time they pass through the birth canal because the womb is sterile. The womb is anything but sterile. There are all kinds of organisms living within the womb that are interacting with the fetus and affecting gene expression in the fetus even at that stage of the game. So it's time that we rewrite the books. Now why would I as a neurologist be interested in gut bacteria, in fecal bacteria?

**Dr. Hyman:** Please do tell.

**Dr. Perlmutter:** I must, because neurology is a very, or has been, for most neurologists, I'd say, a very frustrating field where, for the most part, we've ended up empty-handed in our attempts to deal with such challenging issues as autism and Alzheimer's, Parkinson's, MS,

you name it. Because we've been looking in the wrong place. We've been...Slick Willie Sutton said that... they asked him why do you rob banks. He said because that's where the money is. And by the same token, we've been looking in the brain for answers to these brain problems and we've come up empty handed.

Turns out when you take a broader approach and step back and say well, the knee bones connected to the thigh bone, and the brain is connected to the gut. Maybe there's some information there that we can leverage. When you do that, which is what many researchers have been doing over the past decade or so, you recognize that this relationship between the gut and the brain, and the brain and the gut, is vast. They're in intimate communication with each other, with the gut influencing things like inflammation, immunity, even the production of the neurotransmitters like serotonin and dopamine and GABA, moment to moment, being dependent upon the levels of good versus bad bacteria, which we affect by our food choices, by our over-utilization of antibiotics.

**Dr. Hyman:** We've basically got this inner garden and it grows or doesn't, depending on what you is eating. And it grows weeds or it grows good plants, basically bugs that help you if you eat the right things.

**Dr. Perlmutter:** That's right. And you would ask why would not a gastroenterologist, for example, be interested in that. And I don't want to go there, but I will tell you, some interesting work about Dr. Emeran Mayer at UCLA. He's a gastroenterologist. And what Dr. Mayer did was he took three groups of women, a total of 36 women, and one group received a probiotic-enriched yogurt. Another group got

a yogurt that didn't have probiotic organisms, bacteria, and the third group got a placebo.

And after one month of eating one of three of these foods, he did a special functional MRI scan of the brain while they were looking at a very threatening picture of a face. And what he found was really quite remarkable, published in the "Journal of Gastroenterology." What he found was that the responses of these women changed dramatically, that their response, their anxiety response, was very tempered, calmed down, when they were taking the probiotics. The brain response to the world, to their environment, changed, based upon levels of bacteria in the gut. That's pretty profound...

**Dr. Hyman:** Well, it's pretty amazing. Well, you know, David, when we were in medical school, we used to learn about irritable bowel syndrome. And we learned that it was a sort of a psychosomatic disorder, that people who had it were neurotic and anxious and just wanted medication. And we sort of had a very negative view of these patients. And as I've sort of progressed in my understanding of the body and through the lens of functional medicine, I realized that their gut issues may explain why their brain isn't working.

In fact, an irritable gut may be causing an irritable brain. And there's really good evidence of this, that the gut-brain connection through the neurological system and through the inflammatory processes that happen with the ultra-gut flora, all drive these brain dysfunctions. And the quality of your diet is really what determines that. And you keep talking about prebiotics, about fiber; you're really talking about a lot of plant foods and lots of fiber that help to feed the good bugs in the gut. Could you tell us more about how that...

**Dr. Perlmutter:** Well, that's right. There was a great article...

**Dr. Hyman:** Go ahead.

**Dr. Perlmutter:**...that appeared in "The Journal of the American Medical Association" in 2010, called "Inflammation, Sanitation, and Consternation."

Actually, it was the specialty journal of "Archives of Psychiatry" put out by the JAMA. And in that...that's 2010, they were five years ago, the report by Dr. Charles Raison, R-A-I-S-O-N, which means "correct" or "reason" in French, I might add, from Emory... was that changes in gut bacteria, going from our old friends, bacteria and other organisms that have been with us for tens of thousands of years, to a more sterile gut environment, may well be paving the way for mood issues.

We now recognize that there is this wonderful direct relationship between levels of markers of gut leakiness and major depression. We call that LPS, lipopolysaccharide. It doesn't come from anything else but the gut. It's a covering for what are called the gram-negative organisms. So when you either measure LPS or, more commonly, you measure the body's production of antibodies against it, it's telling you two things. Number one, the gut is leaky, and then that chemicals getting out of the gut, challenging the immune system. And number two, that inflammation has been amped up. Because LPS powerfully induces inflammation.

So we see strong elevations of LPS in major depression. We see it in autism, Alzheimer's. We even see it in ALS, in Lou Gehrig's disease. What I'm saying to you is that it's time that we take a step back from the nervous system and realize that ALS, Lou Gehrig's disease, might well be a gut-related disorder. So although we...

**Dr. Hyman:** Amazing, David. This is stunning, coming from a neurologist who's spent his whole life studying the brain and these diseases...

**Dr. Perlmutter:** You bet.

**Dr. Hyman:**...and you're going down a different direction.

**Dr. Perlmutter:** And I am feeling so empowered at this stage in my life with these revelations. Because neurology has classically been a specialty of diagnose and otiose. Meaning we...great. We could name Wohlfahrt-Kugelberg-Welander syndrome, and you'd walk away saying what in the heck did he just say. But when we finally take a step back and...

**Dr. Hyman:** Yeah, I don't even know that one; I've never even heard that one.

**Dr. Perlmutter:** I had to pull that one out of a hat, because I was...

**Dr. Hyman:** Yeah, I skipped that class in medical school.

**Dr. Perlmutter:** But that said, when we take a step back, and dare I say use the term holistic, meaning to look at the body in a whole perspective, then we begin to get new answers. And the answers are located in the gut, of all places. When we recognize...it was all very exciting several years ago when Dr. Craig Venter and his team sequenced the human genome for the first time. You and I and the rest of the medical community, I think, were thrilled with the notion that this information was going to pave the way for some dramatic new interventions and cures for some of our most pernicious diseases. That didn't happen. What is...

**Dr. Hyman:** No. In fact, I talked to Craig Venter about this. I said, "So what do you think of the Human



Genome Project? Was it successful?" He said, "That depends what you mean. If it's decoding a human genome, yeah, it was successful. If it was having an impact on human disease, than no, it was not successful."

**Dr. Perlmutter:** It was not.

**Dr. Hyman:** And you're going to explain why now.

**Dr. Perlmutter:** Yes. And so what is the Venter Institute looking at now? They're looking at the human microbiomes. Why? Because 99% of the DNA in Mark Hyman's body is bacterial. It isn't the 23,000...

**Dr. Hyman:** Are you saying I'm full of it?

**Dr. Perlmutter:** Pardon me?

**Dr. Hyman:** Are you saying I'm full of it?

**Dr. Perlmutter:** You are full of it. Ninety-nine percent of your DNA is not the 23,000 that you got from mom and dad, which is what the Human Genome Project sequenced. And that's what Dr. Venter's looking at now. As a matter of fact, the president of the Craig Venter Institute is going to be doing a keynote at an upcoming microbiome conference, international conference that I'm chairing. So she's going to be telling us what the Craig Venter Institute is looking at now, and it is the microbiome. That's the future, it's so exciting.

**Dr. Hyman:** That's right. You've got like 23,000 genes as a human, and there are over 2 million genes of bacteria in your gut, and they're all doing stuff that is interacting with your body every minute and determining the quality of your health. What you said just resonated with me, because I'm a doctor. I'm not a researcher. I sit

in my office, I see patients, and I use the principles of functional medicine like you have for decades. And I see remarkable things, all the way from the spectrum of autism and mood disorders and ADD and Alzheimer's and depression and obsessive-compulsive disorder and all these strange brain disorders get better when you treat the body. They're not brain issues; they're systemic disorders that affect the brain.

**Dr. Perlmutter:** Oh, that's true.

**Dr. Hyman:** Right? And I had one little girl who was super violent, a sweet, pretty little girl, aggressive, would bite her sister, or just couldn't get home on the bus because she'd get kicked off the bus 10 times. It turned out she had terrible overgrowth of bacteria and yeast in her gut, based on tests we did. I gave her antibiotics and antifungal and probiotics, some enzymes, some things to help her gut, and her mood completely changed.

I had another woman who was OCD for decades, never could clean up anything in her house because she didn't want to take anything off the floor. And within a few days, she had recovery. And she had very high levels of ammonia in her blood, which is an indicator of bad gut bacteria. I had other patients who were autism and ADD and even Alzheimer's, where you start to change the gut experience and mood disorders and they get better. So this is something that's very true, David. This is the future.

**Dr. Perlmutter:** It is, it's very, very exciting. And we're still very much outliers, but I'm now really feeling good about...

**Dr. Hyman:** I always, David, I always say I have ODD. You know what that is?

**Dr. Perlmutter:** No.

**Dr. Hyman:** I'm odd.

**Dr. Perlmutter:** Odd. There you go. Well, I'm delighted to be hopefully included in that club.

**Dr. Hyman:** Definitely.

**Dr. Perlmutter:** But we were outliers, but now I was told that what I am is a disrupter, and that actually was a compliment. Because it's really the disrupters who allow us to make progress. It's the disrupters, for example, who say we don't need bricks and mortar, this and that, that we'll be an online... Amazon, for example, changed the paradigm, and that's how we make these massive shifts in how we can approach things. So for us to be having discussion about what is going on in the gut and leverage this information for treatment for these devastating brain conditions, that's happening and it's happening right now.

So you mentioned autism, and I have one kid that I treated several months ago. Came in with very poor interactive skills, socially, couldn't speak, and he had challenged his gut...now, he didn't, but his gut was severely challenged, in that his mother was on antibiotics during the entire third trimester of her pregnancy with him. And then early in life, he was hospitalized twice with pneumonia, getting intravenous antibiotics. Nice kid but very autistic. Could never have been on his own, moving forward.

And we actually ultimately arranged for this kid to have what's called fecal transplantation. Fecal material from a healthy person was instilled in his colon, and his mother sent me video of this child. As I was getting ready to give a lecture in Frankfurt, Germany, getting ready to walk up on the stage, I get an email, a text message from her with a video attached. And it's this child having a conversation with her.

Now, this kid, since then...

**Dr. Hyman:** I may have seen that video. It's stunning.

**Dr. Perlmutter:** He's done a report on Benjamin Franklin for school that she recorded and sent to me. And now University of Arizona has just completed recruiting a large number of children with autism to do fecal transplant, because we're very much aware of the research that demonstrates that yes, there is a significant disturbance of the gut bacteria that characterizes autism, that leads to overgrowth of certain species that produce a particular short-chain fatty acid called propionic acid that is a brain toxin, basically, according to work that's been done up in Canada by a Dr. Derrick MacFabe, another of our speakers at our upcoming conference. So there's a lot to talk about, and I think...

**Dr. Hyman:** That's great. I want to ask you something, David...I want to ask you one thing, because I think this is brilliant, this whole insight that the gut and the brain are connected and how we can use therapies such as diet and supplements and probiotics and prebiotics and fecal transplants to actually change the function of the brain across the spectrum of brain diseases. But one of the challenges that I came up with in the research that I'd love to hear your perspective on is when an animal study, for example, or even in humans, when you have high-fat diets, it seems to do bad things to your gut flora and cause more inflammatory responses and more lipopolysaccharides. There was an article on metabolic endotoxemia where they actually showed that giving rats high-fat diets led to more problems. And so let me just sort of get down in the details of this, because the question is what fat? Is it omega-6, is it saturated, is it omega-3, how does that all affect it?

**Dr. Perlmutter:** Exactly, right. The fact that...so that your viewers are aware, when the article came out, and you asked me about that, you remember how I responded to you. It is exactly that, it's the type of fat. I was on a symposium panel with a researcher talking about this, about a high-fat diet that she used in rabbits and induced inflammatory changes. And in front of the 500 people in San Diego, I asked her a simple question. I wasn't trying to be inflammatory myself, but I said, "By the way, what was the fat that you used in your study?" That's a fair enough question. And she didn't know. So I think that it's really critical that we look at the type of fat.

**Dr. Hyman:** Is it corn oil or soybean oil, all right.

**Dr. Perlmutter:** Yeah. And by and large, what is used are these really shelf-stable types of fat that they can put into the chow of laboratory animals. And I think that the same holds true with humans, that again the type of fat that we consume and the context in which it is consumed is also very important. When we eat...

**Dr. Hyman:** Right. What else is in your diet?

**Dr. Perlmutter:** Exactly, and what are you doing and how are you glyrating your proteins, and therefore the other discussion we had about LDL and total cholesterol becomes more relevant. It has to be looked at in terms of the context, the bigger picture. Not just that single variable, because I can assure you that many other things were happening. So again, my fallback position is we've always had fat and survived these two million years. But I want to just get back to an area that you and I were touched upon a moment ago.

**Dr. Hyman:** But before you jump, I want to just say I did follow up

and dig down in this because it was bothering me. And I'm like I'm writing a book about fat and telling people to eat fat, and I'm worried about their gut flora and it's confusing. So the conclusion I came to after looking at all the literature was that if you had high levels of fiber, resistant starch, you had prebiotics, you didn't have processed food and sugar, you had plenty of omega-3 fats, and you didn't eat a lot of the omega-6 refined oils, that if you had coconut oil and saturated fats and olive oil and fish oil, nuts and seeds, those didn't really adversely impact the gut flora if you had them in a context and overall high plant-based fiber diet. And that sort of left me more comfortable with a lot of this research. Because it was concerning, and people do shout out about it.

**Dr. Perlmutter:** Well, let's just look at this for a moment. So here's how I would also respond. And that is if we think that diets that are high in fat are going to increase inflammation, then we would expect more inflammatory issues to be related to diets that have higher levels of fat. Let's look at an inflammatory disease called Alzheimer's.

And a really interesting study that came out in February of last year that looked at the benefit of the Mediterranean diet. Now the Mediterranean diet, for your viewers, is exactly what you've just talked about. It's nutrient-dense, it's colorful, and it has lots of good fiber. It's a really terrific diet. It's been associated with lower risk of coronary artery disease and dementia, I might add, both inflammatory conditions. But what this study actually also did, it was an interventional trial.

**Dr. Hyman:** It's like the MEN study, right? This was like the MEN trial? Or was it something else?

**Dr. Perlmutter:** It was. But this was in addition, what they then did to the cohort was they added more fat. So here's a human clinical interventional trial. They either had these people eat a lot of nuts or they drank a liter, each week, of extra-virgin olive oil. A liter weekly of extra-virgin olive oil. And what they found was...

**Dr. Hyman:** A lot of olive oil.

**Dr. Perlmutter:** Yes, the Mediterranean diet was associated with a reduced risk of developing dementia, but those people who had the nuts, and especially those people who took in even more fat, had even lower risk, 47% reduction risk of cognitive decline.

**Dr. Hyman:** That's unbelievable.

**Dr. Perlmutter:** So that is a human example that I think kind of justifies this notion that more fat is good in the context of the right diet to start off with, which in this case, you and I can debate it a bit, but the Mediterranean diet, I think, fulfills a lot of the things that you and I, think are important.

**Dr. Hyman:** So if you're going to choose between the butter and the bagel, you'd choose the butter.

**Dr. Perlmutter:** I'd choose the butter. In the old days, it was I'll just have the white bread, no butter, because we're on a low cholesterol diet. Now you're eating butter...

**Dr. Hyman:** But now it's grass-fed butter.

**Dr. Perlmutter:**...and not bread.

**Dr. Hyman:** Now that would be grass-fed butter.

**Dr. Perlmutter:** Yes, exactly.

**Dr. Hyman:** It matters, right? It matters, right? It's the quality of the fat.

**Dr. Perlmutter:** Sure, and even if you want to clarify it and make ghee, which is really quite easy to do, it's probably even better, because a lot of the toxic stuff is what you filter out when you make clarified butter. But I think let's now look at diet, as we have been, and other modifiable lifestyle factors like exercise, etc. I think in moving forward to our next conversation, who knows when that will be ... hopefully we'll record it, maybe I'll interview you...and we'll talk about these things in terms of through the lens of the microbiome. Not just how diet affects various biomarkers, glycated hemoglobin, etc., but how does it change the microbiome?

**Dr. Hyman:** How do you grow a good inner garden, right?

**Dr. Perlmutter:** Pardon me?

**Dr. Hyman:** How do you grow a good inner garden?

**Dr. Perlmutter:** That's right. And you know it just in terms of information, one gram of fecal material, that's one fifth of a teaspoon, has about 100 terabytes of information. Think about that.

**Dr. Hyman:** I don't even know what that is.

**Dr. Perlmutter:** Well, a terabyte...

**Dr. Hyman:** I'm a doctor, not a computer scientist.

**Dr. Perlmutter:**...your backup for your computer, it's a terabyte, so that's a hundred gigabytes, right?

**Dr. Hyman:** Oh yeah, right. A hundred gigabytes.

**Dr. Perlmutter:** It's a thousand gigabytes.

**Dr. Hyman:** A thousand gigabytes wow.

**Dr. Perlmutter:** It's a thousand gigabytes, its 100 million terabytes of information in one gram of fecal material. So there is a vast array of information. I was just last week at University of California San Diego, meeting with Professor Larry Smarr, who's been working with NASA, probably I think for four decades, has been on multiple presidential and scientific advisory committees, and really is the go-to guy in terms of utilizing supercomputers for crunching data.

And he's working with a guy named Rob Knight, who's arguably one of the top microbiome researchers in terms of harvesting this information, on the planet. And what is going on now in terms of collecting data and crunching this data is really it's nascent, it's primordial, but it's paving the way for an understanding, a database moving forward that I think we will be able to harvest from to really finally have answers, not just for brain disorders, but for there's so many issues that relate to human health and longevity.

**Dr. Hyman:** You could have called your book "The Joint Maker" or "The Skin Maker" or the anything maker, because when you fix the gut, it fixes everything. We've known that for decades.

**Dr. Perlmutter:** I'm so glad you said that. This is how you get regular, maintain good body weight, and lose the weight you need to, regain your energy, and improve your immune system, which is good for reducing risk for cancer.

**Dr. Hyman:** Okay, so let's get practical now. So we have a few minutes left, I want to get practical. So what do you eat for breakfast, lunch, and dinner?

**Dr. Perlmutter:** Well, I oftentimes I don't eat breakfast, truth be known, because I do a lot of exercise in

the morning and I find that if I eat breakfast, I don't do well when I'm on the elliptical machine or running or stationary bike. The weight lifting is fine, but I don't like a lot of aerobics when I have a full belly. So listen, it's never been written in stone that humans have to have three meals a day. I can assure you that's a recent invention in terms of human nutrition.

I can hardly imagine our hunter-gatherer forebears would suddenly stop because it's lunch time. "Oh, listen, let that gazelle go, I'm stopping for a break, and I'm going to have an energy bar." So oftentimes I don't, but when I do have breakfast, and I do that a couple times a week, I generally have an omelet with either kale and/or spinach, mushrooms, and then I just cover everything with olive oil. I have coffee in the morning. I enjoy a cup of coffee in the morning. I take supplements in the morning. I take an aggressive probiotic. I add to that a prebiotic fiber. And I add also on the side of the omelet...

**Dr. Hyman:** What's that, what's a prebiotic fiber?

**Dr. Perlmutter:** Well, there's a fiber that I take, shouldn't talk brands, but I take a fiber that actually has in it some Acacia senegal, which I think is a really potent prebiotic, and others. But Acacia senegal is really one of the ones I look for. But also on the plate I add kimchi, and kimchi is a fermented vegetable mixture from the Korean...

**Dr. Hyman:** Spicy Korean, spicy cabbage thing, right?

**Dr. Perlmutter:** Very spicy, but I use that as a spice, but I love kimchi. And the reason I have the kimchi is it's teeming with good bacteria. So here's a way to jump start the good bacteria in your gut, getting lots of good nutrients,

getting some good, healthy cholesterol into my diet...that should raise eyebrows...and some good protein as well. And cover the whole thing with lots and lots of olive oil, as much fat as I can get.

**Dr. Hyman:** And then lunch and dinner?

**Dr. Perlmutter:** Well, I'm generally at two meals a day. So if I've had breakfast, I won't have lunch, I'll have dinner.

**Dr. Hyman:** And then what's for dinner?

**Dr. Perlmutter:** And this is what works for me. And again, I think it's good to have significant time between meals. I like the fact that sometimes after dinner, I might not eat for 12 to 16 hours, so that's a period of relative fast that actually, number one, I feel better when I wake up, and I know why. But number two, what you're doing when you have that period of fast is you are putting your body in a slight state of stress that's actually positive. We call this hormesis. And you're actually activating some really good genes, and...

**Dr. Hyman:** Repair mechanisms, right?

**Dr. Perlmutter:** Pardon me?

**Dr. Hyman:** Like your mitochondrial repair mechanisms, to help you ...

**Dr. Perlmutter:** And you're turning on the body's production of a gene called BDNF, brain derived neurotropic factor, the genes that make BDNF, and that allows you to grow new brain cells.

**Dr. Hyman:** It's like Miracle-Gro for the brain, right? That's what that is.

**Dr. Perlmutter:** Exactly right. So when Mark Hyman wants to do a Skype interview, you can have a

couple of smart things to say. So that's why I do that. But truth be known, my father had Alzheimer's disease, and that puts me at risk and I don't want to go down that path. I've seen it happen professionally, I've seen it happen in terms of a family member, and I think it's an avoidable issue.

And I think, again, here's a take-home message that I had mentioned earlier. And that is when you're treating your brain right; you're doing your heart good. You're doing your immune system good. You're treating your entire body the way it should be, reducing inflammation, quenching free radicals, amping immune function. And so this all makes sense. It's not just a heart-smart diet or a brain-smart diet; it's the way to be.

**Dr. Hyman:** It's so true, and I think I just want to reinforce what you just said about your own personal story, because here you are, in my mind one of the smartest doctors and researchers and thinkers that I know in medicine today. And I know you voluminously review the literature, you know what's going on, you talk to so many people, and you have a father who had Alzheimer's.

And you don't want to do anything that's going to increase your risk of getting this horrible disease. You are trying to avoid it at all costs. And if someone like you is actually pouring olive oil all over their eggs and eating grass-fed beef and having coconut oil and ghee and actually including these things in their diet, and getting rid of the sugar and the refined carbs and the processed foods, then gee, I'm paying attention. Because I know you don't want to hurt yourself, you want to do the right thing.

**Dr. Perlmutter:** Yep. And it's truly, and what I've dedicated my life to for not just professional



but personal reasons as well. I was at his bedside. I know what it's like. Countless patients have come through my office and family member say gee, doc, I don't want to end up like Mom or Dad or whatever it is, what can I do? And that's when I sit them down and I say look, you were never told this. You're not going to see this on the evening news because there's nothing that you can advertise. There's nothing to buy here except maybe a pair of sneakers and change your diet. But other part...

**Dr. Hyman:** Look at your body, you're a fit, thin guy and you're 60 now, right? Am I allowed to say that?

**Dr. Perlmutter:** I'm 60. Yeah, sure. I've got no secrets.

**Dr. Hyman:** I'm 55, and I'm eating the same way, and I'm noticing that ghee, as I get older, I'm more alert, I'm more focused, I have more energy, I have less digestive problems, I have more fitness in terms of my capacity to exercise harder, and my body fat has just melted away. It's just melted away. And I'm like how is this possible with all this fat

**Dr. Perlmutter:** Yeah, I was in Weight Watchers when I was in the eighth grade. Eighth grade, I went to Weight Watchers, because I was eating what people eat in those days. And it's even worse now. You just look around and you see what's going on. And it's really a sad commentary. You and I both travel a lot because of the various things that we're doing, and you see a great cross-section at the airports, and what people look like, it is breath-taking and it's just crept up on everybody that this obesity and overweight thing is now the new norm. And there is hell to pay when you're carrying around that body mass index. That waste-to-hip ratio correlates perfectly with decrease in

size of your brain's memory center. The bigger your belly...

**Dr. Hyman:** Big belly, small brain.

**Dr. Perlmutter:**...the smaller is your hippocampus. And the size of the hippocampus relates to your memory function. So what are you waiting for? These are the answers. There's nothing proprietary here. I interviewed a couple weeks ago Gary Taubes, who wrote "Why We Get Fat: And What to Do About It." He's so dialed in. Here's a science writer, not a physician, but a science writer wrote this incredible book, took his hits left, right, and center from mainstream, and yet the science was rock solid sound. And he's out there, just giving this information for people's health.

**Dr. Hyman:** It's great.

**Dr. Perlmutter:** And it's time we listened to this.

**Dr. Hyman:** No, I know Gary, he's very good. He wrote "Good Calories, Bad Calories." He's the guy who wrote that groundbreaking article on the cover of the "New York Times Magazine" that had the butter and steak on it that tried to flip our understanding upside down. He's got...

**Dr. Perlmutter:** And now he has a goal, his foundation has a goal, of reducing diabetes in America by 75% in the next couple of decades.

**Dr. Hyman:** Now, we can do it. In fact, you know, David, now I'm working at the Cleveland Clinic and we're doing diabetes research where we're going to be putting people on 60% or 70% fat diets to reverse their diabetes, to get them off insulin. And it's all connected. This is just an amazing time to be in medicine, it's an amazing time to be focused on nutrition. I'm so happy to be on this journey with you. I can't thank you enough...

**Dr. Perlmutter:** I appreciate it.

**Dr. Hyman:**...for joining today on this Fat Summit and sharing the breadth of knowledge you have and taking us down the winding road of fats and cholesterol and statins and the gut flora and inflammation and all the wonderful things that you've been such a pioneer in helping us understand. So thank you, David. I want to sort of invite everybody to kind of check out David's stuff. Tell us, David, where they can find you, how they can learn more about what you're doing, and support...

**Dr. Perlmutter:** Well, you can find me in Naples, Florida, if you really want to. Online, my website is [drperlmutter.com](http://drperlmutter.com), [D-R-perlmutter.com](http://D-R-perlmutter.com). And my Facebook site is David Perlmutter M.D. My Twitter handle is DavidPerlmutter, oddly enough. And I put out a lot of video content, a lot of blog content, that just really to raise the level of understanding and information based upon what our most well-respected scientists are talking about and publishing.

I think that at the end of the day and at the beginning of the day, it's really important for the level playing field that you and I and others who are sort of the avant-garde in the group, to really relate with the peer-reviewed science, and let people know that this is what scientists are talking about. This is what researchers are telling us. And we've been told other things in the past, but now we've got to move forward, and we've got the information now and it's time to act upon it.

**Dr. Hyman:** It's great. It's like I always say, David, you're kind of like the Wayne Gretzky of medicine. You go where the puck's going to be, not where it is, right? So...

**Dr. Perlmutter:** Well, there was a great quote on the office door of a friend of mine, Dr. Amar Bose. You

probably have his headphones.

**Dr. Hyman:** Of course, yes, I know his son, Vanu, yeah.

**Dr. Perlmutter:** It's a quote from Maurice Maeterlinck, a Belgian Nobel laureate. And it says that every crossway on the road that leads to the future, each progressive spirit is opposed by a thousand men appointed to defend the past. So that's okay, people can defend the status quo and not want to move. Ronald Reagan said the word "status quo" was Latin for "the mess we're in." And I think that...it's a joke, but it's really important that we issue challenges to the current paradigms, and that's how we move the ball down the field. And I intend to stay with that.

**Dr. Hyman:** Right, Dave, well, thank you for joining us today. Great to have you, and let's catch up some more soon.

**Dr. Perlmutter:** Great, Mark, nice to talk to you. Thank you.



# Achieving Optimal Brain Health

Mark Hyman, MD with David Perlmutter MD, FACN, ABIHM

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*The purpose of this presentation is to convey information. It is not intended to diagnose, treat, or cure your condition or to be a substitute for advice from your physician or other healthcare professional.*

**Dr. Hyman:** Everybody, this is Dr. Mark Hymn. Welcome to The Fat Summit, the second fat summit, where we separate fat from fiction. I'm so excited to have my good friend and colleague, Dr. David Perlmutter, with me today. We're at Omega. We're teaching a workshop on reversing dementia. That's right, reversing dementia.

And what I'm so excited about is that David is one of those unique scientists and doctors who's really broken through all the noise, who's telling the story of how our brains don't work and how to get them to work. And he's done this through some amazing work in the field of functional medicine. He's been on our faculty at the Institute for years and years. He's won the Linus Pauling award for his pioneering work.

And he's also written these extraordinary books, *Grain Brain*, which was an international bestseller published in 27 languages -- I can't even pronounce hello in 27 languages -- and *Brain Maker*, which is a really radical book that talks about how the gut microbiome affects the brain, how does your gut affect your brain. All those millions and trillions of bacteria in there, how do they work to control what's going on in your head? So David's here with us today. And we're going to get deep into the story of the brain and fat and health and

deal with some tough topics. So welcome, David.

**Dr. Perlmutter:** I'm so happy to be here, Mark. Thanks.

**Dr. Hyman:** And congratulations on all your success. I've been so happy to watch it. You've been a mentor to me for years. I remember actually going to you when I was sick and asking for your help because I needed somebody who knew what they were doing. And there were very few experts in functional medicine back then. And you were one of them. And you still are sort of a guiding light for so many of us. So thank you.

**Dr. Perlmutter:** I appreciate it.

**Dr. Hyman:** The first question I want to ask you is about vegan diets and fat because there are a lot of people out there saying that we should be eating low-fat vegan, that that's the way to reverse disease, that you can reverse all kinds of chronic diseases. You look at Forks Over Knives on their Facebook page, and you see all these amazing stories and people with beefy muscles and reversing diseases and losing weight.

People are even pushing what they call the 80/10/10 diet, which is 80 percent carbs, 10 percent protein, 10 percent fat. So I wonder what you would say to people who are consuming that diet considering that your brain is like 60 percent

fat. You're a brain doctor. You're a board certified neurologist. So what would you say to those people?

**Dr. Perlmutter:** I think it's a really good question. It's certainly something that we're asked all the time, "What is the health benefit of the vegan diet?" So many people have popularized it. But the truth of the matter is, not a huge number of scientists these days seem to be popularizing it.

People choose the vegan diet for a variety of reasons. Some people do it for moral reasons, etcetera. And I want to throw the widest net possible. I think you can be relatively healthy on a vegan diet. We want to embrace those who, for whatever reason, want to be on a vegan diet. But there are some very important caveats.

And that is first of all, make sure you're getting enough fat. I said fat. And make sure you're getting enough protein. We also see that vegans oftentimes have significant nutritional deficiencies, not getting enough vitamin D because they are not consuming animal products. And even trace minerals, iron and vitamin B12, these things have to be looked at. If you're choosing a vegan diet you've got to be on top of that stuff day and night by making sure you're supplementing yourself and even beyond that making sure that from time to time you're doing the appropriate blood tests to make sure that you're not getting behind.

**Dr. Hyman:** Can you be low-fat vegan and be healthy? Or do you have to be a high fat vegan?

**Dr. Perlmutter:** Well you can be a low-fat vegan. In fact, many vegans are low-fat. I think it's to their detriment. I think when you look at vegans who are low-fat versus high fat vegans... now that sounds contradictory. But you can be a high fat vegan. You can be consuming coconut oil and olive oil and nuts and seeds.

**Dr. Hyman:** And avocado.

**Dr. Perlmutter:** And avocado, and get plenty of fat, healthful fat. It almost sounds ironic, an oxymoron, healthful fat. We've come a long way. We've actually come, though, full circle because we've always, in our existence on this planet, embraced the notion that fat is our friend. And it's only been very recently that fat has been so castigated.

**Dr. Hyman:** That's right. The hunter gatherers ate the fatty organs of all the meat first.

**Dr. Perlmutter:** It was sustaining for them.

**Dr. Hyman:** They would break the bones open, suck up the marrow.

**Dr. Perlmutter:** And eat the marrow. You got it.

**Dr. Hyman:** Fat first, really.

**Dr. Perlmutter:** Yeah, we were told that we should gravitate towards low-fat food, no fat food. And the issue there is when you do so, by default you're going to substitute those calories, replace those calories with, as you mentioned, carbohydrate. And as it relates to the brain, and really to general health, that is absolutely the last thing that you want to do.

Now, I am certainly not advocating that your plate should be loaded up with meat and high fat foods. Most of your plate should be colorful, nutrient dense, macronutrient dense, micronutrient dense vegetables, colorful, full of micronutrients and macronutrients. But you need a good source of protein. You need a good source of healthful fat.

It brings up the point that being vegan you might be gravitated only towards vegetable oils. And I think you can do yourself a lot of harm with many of the commercially available vegetable oils that are out there.

**Dr. Hyman:** Like sunflower oil, safflower oil.

**Dr. Perlmutter:** You got it. These common vegetable oils that have a shelf life of a couple of centuries, it seems like, are really paving the way for illness. They are high in the omega 6s, increasing your risk of inflammation, the cornerstone of Alzheimer's, coronary artery disease, diabetes, cancer, really virtually any chronic degenerative condition that you don't want to get. So I think that the notion of eating more fat is really a good one but as long as we're really quite specific about what fats those are.

**Dr. Hyman:** So yeah, the vegans shouldn't be going for the veggie oils, except for olive oil.

**Dr. Perlmutter:** No. Well olive oil and of course coconut oil.

**Dr. Hyman:** Avocado oil.

**Dr. Perlmutter:** Avocado oil I think is downtown. And so is coconut oil. Coconut oil has the added two benefits of, number one, being highly saturated. You heard me correct, highly saturated. I'm saying eat more saturated fat for a number of reasons. The brain loves

saturated fat.

**Dr. Hyman:** Okay, let's dig in on this. You just said a big bomb you dropped on everybody: eat more saturated fat, which goes against all the government's dietary recommendations, the American College of Cardiology, probably the American Neurology Association.

**Dr. Perlmutter:** If there were one! [Laughs] But it's certainly going against the grain, which is sort of my credo, against the grain. But that said, the beauty of saturated fat is it enhances the functionality of cell membranes. And by virtue of the fact that the fat is saturated, it is highly resistant to being damaged by those chemicals called free radicals. That's one of the beauties of saturated fat.

**Dr. Hyman:** So it's less likely to go rancid.

**Dr. Perlmutter:** Exactly right, less likely to spoil, or perhaps rust, if you want to use that term. As it relates to coconut oil, that's a really nifty way of giving yourself ketones, of raising your ketone level. And that's a fat derived fuel that your brain really loves to have around when your brain is burning fat, as opposed to this notion that well, your brain has to have glucose. It's burning fuel far more efficiently. And it's burning fuel in such a way that it produces less of these damaging chemicals called free radicals.

And here's some new information about the ketogenic diet, or burning more fat, that it tends to turn down the activation of what is now called the inflammasome. Basically it activates a pathway that turns off the activation of a chemical called NF-kappa B. I don't mean to be too technical.



**Dr. Hyman:** Sure you do.

**Dr. Perlmutter:** Sure I do. I've got to impress everybody. But the take home message is that when you're on that type of diet you're actually reducing inflammation. And you want to do everything you can to reduce inflammation, not just for your brain but for your heart, for your immune system.

**Dr. Hyman:** So you're saying the coconut oil in particular and the derivatives of that are very good at reducing inflammation that's damaging the brain.

**Dr. Perlmutter:** That's right. And the health properties of coconut oil, this is brand new information. It's only been published just over the past 3000 years. It was actually published in the vedic text that began talking about the health properties of coconut oil. So hey, this is old news. And now we're just embracing it. But just embracing the notion that food is related to health is a relatively new topic as well.

**Dr. Hyman:** It's so new, yes. So I want to just back up a minute because you dropped a bomb.

**Dr. Perlmutter:** A bomb.

**Dr. Hyman:** You and I went to medical school. We learned that the brain consumes 25 percent of all glucose. The brain runs on glucose. And it runs on sugar. It needs sugar. And you just said that the brain does better on fat than sugar.

**Dr. Perlmutter:** Right.

**Dr. Hyman:** Can you kind of go into that a minute?

**Dr. Perlmutter:** There are researchers, Dr. Michael Veech, for example, plenty of researchers that are indicating that the brain is really going to thrive on a more ketotic type of diet, less carbs,

more fat. And you read people like Gary Taubes, who indicates that in fact probably the normal state of humans, until just very recently, was a low grade of being in ketosis, the fat burning as opposed to glucose burning.

We were all told that, "Oh, you've got to start your day with a short stack with maple syrup and a croissant and a glass of juice because you need that sugar to get you through your school day so you can do well." And nothing is further from the truth. The brain is a highly energy dependent organ. As we sit here our brains are consuming about 25 percent of our caloric expenditure but only occupying about three to five percent of our body weight. So it's really using a lot of energy. So we have to supply the brain with the cleanest source of energy we can. And that is fat, not sugar.

**Dr. Hyman:** That's amazing. So fat is a better burning fuel for the brain.

**Dr. Perlmutter:** For a number of reasons.

**Dr. Hyman:** There was actually a guy who came up to me at the conference here. You weren't standing there. I was with Dale Bredesen. And this was a doctor who got diagnosed with early dementia and has actually reversed it using functional medicine and this whole multifactorial approach.

**Dr. Perlmutter:** Well let me augment that just a little bit. The ketogenic diet as a therapeutic intervention, as a way of treating disease, has been studied in humans with Parkinson's with dramatic success, has been studied in laboratory animals with ALS, or Lou Gehrig's disease, with dramatic success. So it should, in my opinion, be part of the recommendations we make for ALS disease, which

is almost universally fatal, for which there is no pharmaceutical intervention.

And I think clearly when we see the benefits in Alzheimer's, to the extent that there is an FDA approved medical food that works on this platform to increase the availability of ketones, it really makes sense that we recommend coconut oil. Dr. Mary Newport wrote a book about a patient of hers who happened to be her husband and about his ability to regain his cognitive function going on a highly ketogenic diet with added sources of ketones.

**Dr. Hyman:** Yeah, I've seen that recently in a patient with Alzheimer's. She was doing great for many years, about seven years in, then started to decline a little bit. I was thinking, "Why don't we ramp it up and go on a ketogenic diet?" It was like the lights went on. She just woke up. She was clear. She remembered everything. It was really pretty remarkable. And when you look at the really severe brain diseases, these are the things we're talking about treating with extremely high fat diets: epilepsy, brain cancer, Alzheimer's, ALS, Parkinson's. These are no small diseases. And they're responding to these extremely high fat diets because the brain seems to be better with less sugar.

**Dr. Perlmutter:** Quite dramatically. So the take home message here is it seems counterintuitive on one hand that the brain loves to burn fat as a fuel. As you mentioned the brain is made up of fat from a structural perspective. Where does it come from? It comes from our food. We've got to give the brain the raw materials so it can be built and maintained appropriately and from a fuel perspective as well.

We've had dramatic success in helping people with intractable

epilepsy. In other words, they're on medication. They're still having seizures. And this was first proposed in the 1928. I wasn't around then, but there wasn't really an armamentarium -- a little older than you but not that old -- of medications for epilepsy. And even today, the recommendations today is if you fail two pharmaceutical agents for epilepsy you should be considered to have surgery for possibly having part of your temporal lobe removed because you failed the drugs.

**Dr. Hyman:** That's pretty scary. There was actually a study on ketogenic diets in epileptics, looking at the effect on their cholesterol, because their cholesterol, they get worse for a bit. But if they followed them over time it actually kind of normalized and actually optimized, which was kind of fascinating.

I was telling you that story about this guy who came up to me at the conference here who had early Alzheimer's, a doctor. He reversed it. And then he decided to go with his buddies to IHOP. And he had this big pancake breakfast with syrup and all this glucose. And he said he went home, and he regressed completely to his previous state. And it took him a week to recover.

**Dr. Perlmutter:** What is IHOP? I Have Overwhelming Problems? Is that what it stands for?

**Dr. Hyman:** It's the International House of Pancakes. But yes, it's probably going to lead to overwhelming problems.

**Dr. Perlmutter:** And that's what a lot of people eat.

**Dr. Hyman:** Sugar for breakfast.

**Dr. Perlmutter:** Yeah.

**Dr. Hyman:** Sugar for breakfast, sugar for lunch, sugar for dinner.

**Dr. Perlmutter:** And it's just pounding your body with killing carbohydrates.

**Dr. Hyman:** Well the flip side of this is that the brain runs on fat, but sugar is actually damaging to the brain. This whole idea that we now have type 3 diabetes, being Alzheimer's, that we have this glucotoxicity that you talked about in your lecture here at Omega, but how these sugars affect the brain in a negative way. Could you kind of go into that for a minute?

**Dr. Perlmutter:** Sure. First, we've never eaten sugar. We never had access to sugar and carbohydrates.

**Dr. Hyman:** You could climb a honey tree.

**Dr. Perlmutter:** Yeah, maybe we would get some honey. But we would learn our lesson when we got stung. But it's not like our hunter gatherer forebears would stumble on a wheat field or an apple orchard or bottles of orange juice hanging from the tree.

**Dr. Hyman:** You have an orange juice tree?

**Dr. Perlmutter:** No, there isn't come to the Florida orange juice tree. But the bottom line is, there is a place in human survival for access to carbohydrates in the late summer, early fall. The berries are ripe. We eat a little bit of sugar. And this sweet tooth that we all carry allowed us to survive. Why? Because the sugar stimulated us to make insulin of course. And insulin allowed us to make body fat. So we made it through times of calorie scarcity through the winter. It was a survival mechanism. But that's now in play 365 days a year. It is the cornerstone of obesity.

So sugar is directly toxic to the brain. And it was obviously the secondary title of *Grain Brain*, why we talk about the toxic effects of sugar, carbohydrates, and gluten. We'll get to the rest of the subtitle in just a bit. But sugar, the biggest issue I believe... actually, I can't say biggest now, but one of the issues, at least that we talked about in *Grain Brain*, was the effect of sugar in terms of changing the structure of proteins in the body. Wow, what does that mean?

**Dr. Hyman:** Yeah, what does that mean?

**Dr. Perlmutter:** There is a process called glycation. And that means sugar, when it's elevated, binds to protein.

**Dr. Hyman:** It's like the crust on a bread or the crème brulee, that crispy thing.

**Dr. Perlmutter:** Exactly, when they torch the crème brulee with the torch.

**Dr. Hyman:** It's like crème brulee in the brain, right?

**Dr. Perlmutter:** You got it, rusting. But when that happens, when sugar binds to protein, it does two important things that are detrimental. It increases free radical production, those damaging rusting chemicals, and it amps up inflammation, the cornerstone of Alzheimer's disease. So you don't want to glycate your proteins.

So a simple test that you can have is available in any doctor's office. It's called the A1C. And that measures the degree of glycation, or sugar binding, to the protein called hemoglobin. And if you're diabetic you know your A1C right now because your doctor's checking it about every 90 days. So you really want to reverse that process.

And you do so by lowering your intake of sugar, your intake of carbohydrates, and eat more fat. You can also take various nutritional supplements that are called anti-glycating supplements. Things like NAC and alpha lipoic acid tend to reduce this process of glycation.

**Dr. Hyman:** Actually, a friend of mine's a doctor who's actually running this summit with me, Carrie Diulus, who's a type 1 diabetic.

**Dr. Perlmutter:** Really.

**Dr. Hyman:** Yeah, and she recently became a type 1 diabetic and was into all this beforehand. And she used a ketogenic diet to control her diabetes. And she's got her hemoglobin A1C at like 4.5, 4.6, which is super low. She never goes hypoglycemic. And her doctor, who's a diabetologist, said, "I'm going to fire you from my practice unless you raise your hemoglobin A1C because it's dangerous. It means you're getting too low."

**Dr. Perlmutter:** What would be the literature that indicates that a low A1C is dangerous?

**Dr. Hyman:** There's none. It's just he's worried she's getting hypoglycemic. But she feels awesome. And she's got a better blood sugar control eating that, being a diabetic, than most of us walking around eating food.

**Dr. Perlmutter:** So the notion of her being on a ketogenic diet is very interesting because it's something that I think a lot of type 1 or insulin dependent diabetics would shy away from. And to some extent there's some rationality for that because of the risk of bottoming out of their blood sugar. Once you are in a state of ketoadaptation, where your body is really adept at using fat as a fuel, a lot of times this is a very good diet for a type 1 diabetic. Of course caveat, check

with your own doctor.

**Dr. Hyman:** But most of us don't need to be on a ketogenic diet, right?

**Dr. Perlmutter:** I think that most of us should, in fact, be somewhat ketotic. In other words, we've got to limit our carbohydrates in the 60 grams a day and really add in the good fats, especially the MCT oil, the coconut oil, that are going to amp the availability of ketones.

And one other thing, if you look at risk of becoming demented based upon your blood sugar, a wonderful study appeared in *the New England Journal of Medicine*, September of 2013. They took a couple of thousand people. They did one sophisticated test at the beginning of the study. They measured their fasting blood sugar, end of story. They followed them for about seven years.

And they determined who became demented. And their findings are really profound because they found that those people who were at higher risk for dementia had elevation of their blood sugar. But these were not high levels of blood sugar.

**Dr. Hyman:** No, no, you're right.

**Dr. Perlmutter:** This is 105 and 110, well below the level of diabetes.

**Dr. Hyman:** What is normal, right? Is normal 100? Is it 110?

**Dr. Perlmutter:** Yeah, that's good. That's exactly where I was going. We've got to redefine what is normal but more appropriately what is optimal? What is the best blood sugar?

**Dr. Hyman:** Right. Well there was another study, I think, a number of years ago that looked at heart disease. And they found that

anything over 87 there was a linear increase in the risk of heart attacks, even if your blood sugar was like 88, which we think is fine. Maybe the normal's 70 to 80.

**Dr. Perlmutter:** Well normal, what does it mean? Does it mean average? We want to look at what is optimal. And I think that the studies more and more are indicating that lower is better. That said, we do see that there is a dramatic increase in the shrinkage of the brain's memory center that also correlates to blood sugar levels.

**Dr. Hyman:** So you're a neurologist. And we've been talking about ketogenic diet and saturated fat and the brain. But there's a concern around Alzheimer's that people who have this ApoE4 gene, this gene is a gene that predisposes you to Alzheimer's, if you have two copies of it, you have like a 75% increased risk of getting Alzheimer's.

**Dr. Perlmutter:** Well you have about a 70 percent chance of getting Alzheimer's, so increase over baseline, yes, right.

**Dr. Hyman:** Yeah, but also, when you have that gene, it also seems to raise your cholesterol. And when you look at the recommendations around people that have that gene, it's to eat less saturated fat. So I'm trying to reconcile in my own mind, as a practitioner, and also, too many people are thinking about this, we've talked about this, how do you reconcile the recommendations to eat less saturated fat if you have ApoE4 because it raises cholesterol with what you're saying? How do we make sense of all that?

**Dr. Perlmutter:** I think the first thing I would say is what would be the risk for the brain of raising your cholesterol? And it's more than just a rhetorical question. It turns out that the higher your cholesterol after age 70, the lower

is your risk for dementia. So that's actually a good thing. This notion of cholesterol being the enemy of human physiology is absolute nonsense, especially as it relates to the brain. Twenty-five percent of the entire cholesterol content of your body is in the brain, where it serves as an antioxidant. It sacrifices itself.

**Dr. Hyman:** So your brain is like a big egg then, with all this cholesterol.

**Dr. Perlmutter:** Well, yeah, it is. And that's why to this day I'm mystified when I go into a restaurant and I see the egg white omelet. Why would you want to take the yolk out of the egg? That's where all the good things are, the cholesterol, for example.

So the notion that lowering cholesterol is somehow good for the brain prompted a lot of the studies that tried to justify the use of statin medications as treatments for Alzheimer's disease. And I think we've seen uniformly that statins are basically across the board about the worst thing you can do for your brain, to the extent that there is now a requirement on the label of statin drugs that these drugs can affect memory.

**Dr. Hyman:** So the black box warning on the label of drugs like statins that say, "This is not good for your brain."

**Dr. Perlmutter:** Yes. And really, from a mechanistic perspective, it's very easy to understand on two levels. We know that statins are directly affecting the mitochondria, the energy producing particles within our nerve cells. Each nerve cell may have a thousand mitochondria. Their functionality is comprised when statins are on board.

And the brain is a very highly energy dependent organ. And beyond that the same pathway, the same enzyme HMG-CoA reductase that allows statins to reduce the production of cholesterol, is the same enzyme that when it is inhibited impairs coenzyme Q10 availability.

**Dr. Hyman:** You say there's a mechanism; makes sense. It also increases diabetes.

**Dr. Perlmutter:** Absolutely.

**Dr. Hyman:** So you get more insulin resistance.

**Dr. Perlmutter:** That's right. The studies have indicated that in both males and now in females as well there's about a 49 percent increased risk of becoming a type 2 diabetic when you're on a statin medication. And when you're a type 2 diabetic, we used to say, "We'll double your risk of Alzheimer's." It looks like now it's going to quadruple your risk.

**Dr. Hyman:** So what do you say as a cardiologist? You're like, "Listen, for their heart they need the statin because they've had a heart attack. They have blockages. And it's been shown to stabilize plaque, to reduce inflammation."

**Dr. Perlmutter:** Well, and I'm not going to say...

**Dr. Hyman:** And we should [inaudible] these new drugs that lower LDLs even more.

**Dr. Perlmutter:** Yeah, and I'm not going to say that that data is necessarily totally off base. But I think that if we look at how statin medication works, there are other things that it's doing aside from lowering cholesterol and aside from inhibiting HMG-CoA reductase. Statins do, though, I hate to have to admit it, act as a bit of an anti-

inflammatory. And we understand that coronary artery disease, like Alzheimer's, is an inflammatory condition. So therefore perhaps it is the anti-inflammatory effect.

**Dr. Hyman:** But there are a lot better ways to lower inflammation.

**Dr. Perlmutter:** You got that right. So the notion that cholesterol's bad and we have to lower it at all costs, I think, is...

**Dr. Hyman:** But these new class of drugs, these injectibles, are like 50 grand a year. They're going to get their cholesterol LDL down to 10. And doctors are so excited about that.

**Dr. Perlmutter:** Right. Now let's clarify what you just said. They're going to get the LDL down dramatically, the so called bad cholesterol. Well what's bad about the carrier protein to deliver cholesterol throughout the body to where it is needed? But somehow somebody came up with the moniker for LDL, calling it bad. Some marketing genius on Madison Avenue came up with that and got some kind of award.

**Dr. Hyman:** It must've been a pharma marketing firm.

**Dr. Perlmutter:** Of the year. But LDL is not bad nor is HDL necessarily good. If you're saying LDL's bad then either God or nature or somebody made a mistake by putting it there. And we used to say, "Oh, we may as well yank out your appendix when we're doing your hysterectomy because you sure as heck don't need that," and your tonsils. Who needs tonsils?

**Dr. Hyman:** Who needs those extra organs?

**Dr. Perlmutter:** Right, who needs tonsils?



**Dr. Hyman:** I want to die with everything that I came in with, thank you.

**Dr. Perlmutter:** Right, I want to walk out with it. But the point is, LDL is vitally important for your health. The issue with LDL becomes manifest when LDL as a protein -- getting back to what you and I talked about earlier -- as a protein it is susceptible to being bound to sugar in the process of glycation. When you bind LDL to sugar because your sugar is persistently elevated, it becomes glycated. The level of glycated LDL parallels the A1C. So if you have your A1C checked you can get a sense as to what your glycated LDL is. And the more you glycate LDL, that corresponds perfectly to its degree of oxidization.

**Dr. Hyman:** And there are new tests. You can measure your oxidized LDL.

**Dr. Perlmutter:** You can measure oxidized LDL, absolutely, right now.

**Dr. Hyman:** LabCorp does this.

**Dr. Perlmutter:** That's right. It used to be quite difficult. Now it's very, very easy. That's the test you really want to get because once LDL is oxidized, it can't perform its function. It can't bring cholesterol to where it's needed in the face of inflammation. So LDL was carrying cholesterol to the coronary artery when inflammation was present. Suddenly they saw all this cholesterol there. And they implicated cholesterol as being causative. But it was the fireman at the scene of the fire trying to help out. Yet because it was there we said, "Oh, look at all the cholesterol. That's got to be the cause."

**Dr. Hyman:** Yeah, interesting. All right, let's change tacks for a minute.

**Dr. Perlmutter:** Okay.

**Dr. Hyman:** You wrote this book called *Grain Brain*, which sort of implies that grains are bad for the brain, particularly gluten, which I think I would agree with. Yet what about the fact that so much of the world's population does eat grains and that grains have been shown to reduce all sorts of diseases. Should we banish them completely, or is it just certain grains? And if you can eat grains, well what should we be eating and how much?

**Dr. Perlmutter:** Terrific question. So I write *Grain Brain*. And the title would imply that I'm castigating all grains. And I'm not. But I think by and large in the world grain pretty much means wheat. There are other grains and things that are grain like that are sort of thrown into that.

**Dr. Hyman:** Well rice, corn, wheat, and sorghum are the big grains.

**Dr. Perlmutter:** Sure, and quinoa is often talked about, though not necessarily by definition a grain. But I think there are two things to talk about, number one, the carbohydrate content. So you can have some wild rice, but you can't fill your plate with it. There's no gluten there. That's another topic we'll talk about. And have some corn. By and large most of the corn here in the United States is genetically modified, which is a whole other topic.

**Dr. Hyman:** Like corn on the cob?

**Dr. Perlmutter:** Corn on the cob non GMO is not the worst idea. But you've got to portion control. Why? Because you have to factor that into your carbohydrate load. But most of the grain that people eat here in America is to be avoided. Why? Because most of it's wheat and corn, corn being GMO, sprayed with glyphosate, sprayed with this

herbicide. And of course wheat also sprayed with...

**Dr. Hyman:** Well very little of the corn we eat in this country is in the form of corn on the cob. It's mostly in the form of byproducts of corn manufacturing. It's in processed food and high fructose corn syrup, which we shouldn't eat at all.

**Dr. Perlmutter:** Exactly right. And of course wheat is a source of gluten. But there are gluten free aisles in the grocery store now that you think, "Well, I'll just eat these foods because they're gluten free."

**Dr. Hyman:** The gluten free cookies.

**Dr. Perlmutter:** Gluten free cookies, cakes, pasta, you name it. And you are pounding yourself with the detrimental carbohydrates though you think you're doing your body a great service.

**Dr. Hyman:** They're actually worse, right? They often have a higher glycemic index than the wheat.

**Dr. Perlmutter:** They have a very high glycemic index. And people don't recognize that even though it's gluten free, you are really jeopardizing your health. So the caveat here is if you're going to be eating gluten free foods, you've still got to watch the carb content. Look at the glycemic index, very important.

**Dr. Hyman:** I always say an avocado's gluten free.

**Dr. Perlmutter:** Right. So is grass fed beef.

**Dr. Hyman:** Asparagus is gluten free, right? Beans are gluten free.

**Dr. Perlmutter:** You're now seeing these foods labeled gluten free. An avocado being labeled as gluten free, well there's a revelation for you.

**Dr. Hyman:** It's good marketing.

**Dr. Perlmutter:** Yes, for sure.

**Dr. Hyman:** My basic rule is if it has a health claim on the label, don't eat it.

**Dr. Perlmutter:** Or more than one ingredient.

**Dr. Hyman:** Right. So you're saying that people can eat grains. You just have to eat whole grains.

**Dr. Perlmutter:** Yes, absolutely.

**Dr. Hyman:** And you have to watch quantity.

**Dr. Perlmutter:** I would say watch quantity. I'd go for non GMO, obviously.

**Dr. Hyman:** Non GMO.

**Dr. Perlmutter:** Organic.

**Dr. Hyman:** Non gluten grains.

**Dr. Perlmutter:** Absolutely. If you want to have a small serving of wild rice next to your asparagus...

**Dr. Hyman:** Wild rice is actually a seed, right?

**Dr. Perlmutter:** It is, by definition, a seed of grass. And therefore it's a grain. But to have a little wild rice next to your asparagus and your small portion of grass fed filet mignon, have at it. Again, the point, and getting back to *Grain Brain*, is *Grain Brain* is not load your plate with short ribs and beef, you just killed an animal, it's a real paleo experience. Most of your plate should be vegetables, nutrient dense vegetables, with lots and lots of fiber. That's really one of the biggest issues, the biggest untold story. Aside from the carbohydrates, aside from the fat, is we're not getting enough fiber to nurture our gut bacteria.

**Dr. Hyman:** Yeah, we need that. So the whole idea of this diet is essentially what I've been calling the pegan diet, which is kind of a joke. I made fun of some friends of mine who are paleo and vegan. And I go, "I must be a pegan." But really, when I thought about it, it's actually what we should be doing, mostly plant based with small amounts of good quality animal protein, right?

**Dr. Perlmutter:** Right, and just to clarify, there are plenty of people out there talking about the merits of a plant based diet. I think they're right. I think they're dialed in. But I think there is the place for some animal protein. A lot of the studies that characterize, negatively, the effects of eating meat may well be on target. Why? Because they don't differentiate. These are retrospective studies based on food frequency questionnaires.

In other words, you fill out the form every week about what you ate. Did you eat meat or did you not, etcetera. And how much do you think you normally eat? Great. But it's like saying, "Well, we're going to be doing a study on alcohol consumption, and we're not going to make any differentiation between merlot and Jack Daniels."

So the point is, the type of meat, I think is fundamentally important. Factory raised, grain fed, GMO glyphosate treated grain fed, antibiotic treated meat I would avoid like the plague. This is not a health food. On the other hand, a small portion of grass fed beef, maybe a little marbling, some good fat, high in omega 3s, this is really good for you.

**Dr. Hyman:** And none of the studies, by the way, were done on those. They were all done on the wrong kind of meat.

**Dr. Perlmutter:** Exactly.

**Dr. Hyman:** And also, the meat eaters in those studies, which were observational studies, can't prove cause and effect, they all had bad habits. They were smoking, drinking too much, not exercising, not eating fruits and vegetables, having too much sugar. They weighed more. They ate more calories. So of course they were sicker.

**Dr. Perlmutter:** No question.

**Dr. Hyman:** So those studies have problems.

**Dr. Perlmutter:** And there's a sort of a sense in the cardiology community that the lower fat, the lower animal based fat, the better. And I think when you look at some of those studies, there are other factors involved in the program that is supposedly really good for your heart. Like exercise and meditation are incorporated in that program. And yet the people who are proponents of that program tend to downplay the multipronged approach.

**Dr. Hyman:** Yeah, it's true. Actually I work at Cleveland Clinic now. And I've been engaged in a dialogue with the food service people. And Dr. Roizen and I talked about how they were serving white bread to the heart patients after surgery and that their diet in the hospital for a heart healthy diet is a high carb, low-fat diet. And we had this whole big dialogue with all the people in food service and Sodexo, which makes the food. And we're like, "The science has to be represented in the food that we serve our patients. We can't do this anymore."

**Dr. Perlmutter:** But you're in perfect contradiction with the achievement of the bottom line.

**Dr. Hyman:** No, no, no, they want to do the right thing.

**Dr. Perlmutter:** They want to do the right thing. But by and large, in hospitals, they want to just get food to people as cheaply as possible. And those are the cheap foods.

**Dr. Hyman:** So one of the things that you've done besides sort of breakthrough in the world of Parkinson's and glutathione, which I was a huge student of -- it's really revolutionized my practice -- besides talking about the effect of gluten on the brain and the grain brain is you really kind of branched out into a topic that's pretty strange for a neurologist with this poop.

You wrote a book called *Brain Maker*, which is about the role of the microbiome, this whole new universe we're learning about in the gut on the brain and how that affects so many different diseases, affects our health. And when I talk to you now you're talking about prebiotics and special fibers and fecal transplants. What's a neurologist doing in a place like this?

**Dr. Perlmutter:** Well just in thinking about it, we have been at this for a long time. And I think one of the issues, one of the fundamental tenets of functional medicine, is to embrace, to embrace ideas and approaches that are somewhat contradictory with the mainstream focused approach of specialized medicine. It's to take in the big picture. And what we now understand is that events gut related have a profound effect upon the brain.

In my training the brain and the gut were seen as highly disparate body systems, that the brain was in Cleveland and the gut was somewhere in Louisiana, and they didn't communicate. We know that all aspects of gut function are involved with the brain and vice versa. It's a bidirectional communication that goes on. But

when we recognize that vitamins that are important for brain health are manufactured in the gut, that the neurotransmitter, serotonin...

**Dr. Hyman:** Wait, you just said vitamins are made in the gut by...

**Dr. Perlmutter:** Vitamins are made in the gut by gut bacteria.

**Dr. Hyman:** Gut bacteria, that's revolutionary, right?

**Dr. Perlmutter:** Well it's fact.

**Dr. Hyman:** It's science, but people don't realize that.

**Dr. Perlmutter:** B vitamins, for example, that are helpful in lowering that, homocysteine, that is so detrimental to brain health, are made in the gut, neurotransmitters that people talk about, neurologists and psychiatrists. Things like serotonin, dopamine, norepinephrine are 90 percent made in the gut. They're not neuro-brain manufactured. Inflammation, the set point of inflammation, is dictated by the health of the gut and managed by the diversity of the gut bacteria.

**Dr. Hyman:** Okay, I'm going to pause here. So you said that inflammation, which we know is linked to heart disease and dementia and cancer and diabetes, the set point for inflammation is controlled by your gut bacteria?

**Dr. Perlmutter:** Exactly. So the gut bacteria control the permeability of the gut lining, one cell that separates the sewer from the rest of your body. And that one cell, the integrity of that cell, is maintained by various of the so called probiotic organisms. For example, *Lactobacillus plantarum* plays a huge role in the maintenance of the integrity of that gut lining.

We threaten that gut lining with various influences over which we have control. Gliadin, for one, a protein found in gluten, compromises that integrity when we change the balance of gut bacteria, nonsteroid anti-inflammatory drugs, proton pump inhibiting drugs, the acid blocking drugs that are so common.

**Dr. Hyman:** All these damage and cause a leaky gut.

**Dr. Perlmutter:** They cause a leaky gut.

**Dr. Hyman:** Right, the gluten proteins, the antibiotics, the acid blockers, the anti-inflammatories, these are all gut busting drugs.

**Dr. Perlmutter:** Gut busting and they threaten the integrity. Once you breach the wall, once that wall has been breached, and the gut becomes leaky, then certain chemicals in the gut, like something called LPS, lipopolysaccharide, makes its way to challenge the immune system. And then inflammation is amped up from stem to stern not just in the gut but the brain, the joints, the skin, the lungs, the heart.

**Dr. Hyman:** Yeah, you presented today an amazing set of data on the high levels of these LPS proteins, where sugar and proteins combine, that are from bacteria. They're like bacterial toxins, in so many different diseases, right?

**Dr. Perlmutter:** That's right.

**Dr. Hyman:** What diseases did you find?

**Dr. Perlmutter:** Well, so this is lipopolysaccharide, which represents the covering over what are called the gram negative organisms. So we've got a lot of those in the gut.

**Dr. Hyman:** From bacteria, right?

**Dr. Perlmutter:** And we can measure either lipopolysaccharide in the blood or even antibodies against it, which is another surrogate marker for LPS. We see dramatic elevations in patients with Alzheimer's disease. Why would you have a high level of LPS in Alzheimer's? Because it's indicating leakiness of the gut and turned on inflammation. We see it in Lou Gehrig's disease, where the correlation to the severity...

**Dr. Hyman:** ALS.

**Dr. Perlmutter:** ALS, Lou Gehrig's, autism.

**Dr. Hyman:** So in other words, the higher levels of LPS, the worse the severity of ALS.

**Dr. Perlmutter:** Of ALS. We see it in autism, a dramatic elevation of the ALS correlating with the disease that we think is a brain related disease. We've got to start looking at the gut. We see dramatic elevation of LPS in major depression, saying that depression is an inflammatory disorder.

And how intriguing is it that these drugs that are so commonly used in depression, we call them SSRIs, we were all taught that they worked because they helped increase serotonin. They're actually anti-inflammatory. They actually reduce one of the inflammatory meat eaters called TNF-alpha. So we know that now evidence shows that depression is really an inflammatory disorder.

**Dr. Hyman:** It's true. I've seen studies where they used the autoimmune drugs for autoimmune patients. And their depression gets better.

**Dr. Perlmutter:** That's right.

**Dr. Hyman:** By shutting off the inflammation in the brain.

Dr Perlmutter: Well these are drugs that are specifically designed to exactly turn down the availability of TNF-alpha.

**Dr. Hyman:** So what do you tell people who want to get a healthy gut and fix this problem? What's your advice?

**Dr. Perlmutter:** Well, it really gets back to the 4-R program that you and I have been schooled in for years and years.

**Dr. Hyman:** In functional medicine.

**Dr. Perlmutter:** That's right, in functional medicine. That is, we first have to identify what it is that's damaging the gut. And we need to remove that. We need to remove things like gluten. We need to remove the capricious and over usage of antibiotics, the NSAIDs, the proton pump inhibitors. And we really are not yet fully versed into how so many of the drugs that are commonly used are damaging the gut.

**Dr. Hyman:** The acid blockers, that and stains are among the two most common drugs. And they're highly damaging to the gut.

**Dr. Perlmutter:** That's right. And here's an interesting thing about these acid blocking drugs that we call proton pump inhibitors. They damage the gut bacteria in a number of ways. One way is they of course change the acidity or change the pH of the gut. And they make the environment less hospitable for the bacteria that live there.

But now we understand that they are actually able to change the way the bacteria themselves regulate their pH or acidity within each of the bugs. So they represent a significant threat. And that very well explains

why chronic use of these proton pump inhibitor drugs are associated with a dramatic increased risk of this diarrhea illness that can be fatal called C.diff, hip fractures, vitamin B 12 deficiency, and even, recently published in PLOS ONE, a study from Stanford showing a significant increase not just in the risk of having a heart attack but doubling of your risk of dying from that heart attack.

**Dr. Hyman:** Wow, so if you take an acid blocker for heart burn, you're doubling your risk of having a heart attack.

**Dr. Perlmutter:** It's going to burn your heart. So heart burn is well said. But you don't see that on television. All you see is people, they don't digest their food. They pop the drug, and they go to the picnic. They eat whatever they want. If you're eating a food that doesn't agree with you, then the message here is don't eat it. Don't think you're going to take a drug and then eat crap. You shouldn't.

**Dr. Hyman:** We should be eating more probiotics and prebiotics in our food, right?

**Dr. Perlmutter:** There's a big move to take supplements. And we'll get there. But understand, humans have been eating fermented foods for a long, long time. These are foods like kimchi, kombucha, kefir, sauerkraut. And even before that, when we weren't actively fermenting foods, we were eating foods that we'd find on the ground as hunter gatherers.

**Dr. Hyman:** That got a little bad.

**Dr. Perlmutter:** It went a little bad but loaded with bugs.

**Dr. Hyman:** So what do you think, eat rotten food?

**Dr. Perlmutter:** Well I'm saying



that we have to get over the notion of everything being sterile and embrace the idea that by and large germs are our friends.

**Dr. Hyman:** No more hand sanitizer for you, David Perlmutter, right?

**Dr. Perlmutter:** Well, we're living still with the echoes of the germ theory.

**Dr. Hyman:** I actually go out of my way to eat food that's on the floor.

**Dr. Perlmutter:** Do you?

**Dr. Hyman:** I do. I'm like, "Oh, good, it fell on the floor. I'm going to eat that."

**Dr. Perlmutter:** The five second rule in our house, we don't have a five second rule. It was a minute. And now it's just, well...Their house is so clean.

**Dr. Hyman:** Inside of a week. If it's been there a week I'm like, "Oh, good."

**Dr. Perlmutter:** Well, it's fermenting. It's full of good bacteria. But they used to say, "Oh gosh, you could go to his house; you could eat off the floor." Yeah, because there's lots of food there. I'm going to visit you.

**Dr. Hyman:** So David, we're going to wrap up in a minute. But I wonder if there are any final words of wisdom you have for people for their health, for fat, for their brain? Any takeaways?

**Dr. Perlmutter:** I sure will. I'd say that you are right on target. Your new book, *Eat Fat, Get Thin*, it's well beyond the cosmetic issues of looking good because your belly got smaller. Body fat will kill you. Body fat amps up inflammation and is profoundly detrimental to your brain. There's a perfect correlation between the size of your belly

and the shrinkage of your brain's memory center, the hippocampus.

So people think they want to lose weight because they want to look better. Have at it. But you're going to do so by adopting a higher fat and much lower carbohydrate, much lower sugar diet. And you've got to add in the nutrition to amp the health of your gut bacteria. And that is the prebiotic foods, the jicama, the dandelion greens, the artichoke, the onions, leeks, and garlic. These are foods that are rich in what is called prebiotic fiber.

And that's what your good gut bacteria need. You can go to the health food store. You can buy prebiotic fiber that comes from acacia gum. Fantastic. It will amp your good gut bacteria.

**Dr. Hyman:** And you told me how if you lose weight and get fit and thin...

**Dr. Perlmutter:** You will be lean and mean, ready to go hunting and gathering.

**Dr. Hyman:** That's awesome. And the good news is that David, you've just come out with a book called *The Grain Brain Whole Life Plan*, which lays all this out, integrates it into a really practical take home how to live this lifestyle. Everybody should go get it right away. You even get a free DVD if you preorder.

**Dr. Perlmutter:** Act now.

**Dr. Hyman:** Yeah, right?

**Dr. Perlmutter:** Well, yes. And I'll tell you really where this book is coming from. It's my experiences not just as a clinician, but here I am 61 years old. I have a father who I've just lost, with Alzheimer's disease, so putting me at risk.

And it really is well what have I learned not just from practicing medicine, but what does a 61-year-old male with a positive family risk for Alzheimer's do day to day? How do you travel? How do you exercise? How do you make it work? What is the importance of gratitude, of empathy, of social interaction, of sleep, of aerobic exercise, all of these other lifestyle factors well beyond diet that are really fundamental.

**Dr. Hyman:** Yeah, all of it. That's so great, David. Well, thank you so much for joining us. And I can't wait to read the new book.

**Dr. Perlmutter:** Great. Thanks, Mark. Good to see you, brother.



# Upgrade Your Brain by Optimizing Metabolism

Sara Vance, CN with Max Lugavere

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**Sara:** Hello and welcome. I'm Sara Vance, author of The Perfect Metabolism Plan and your host for The Metabolism Summit, where we're connecting you with top experts and influencers in the industry to help you understand how to regain control of your metabolism and weight and achieve the vibrant health you deserve.

I'm absolutely thrilled to be joined today by a documentary filmmaker and passionate researcher and influencer, Max Lugavere, who's going to help us understand how we can upgrade our brains by upgrading our metabolisms. Max, thanks so much for being here today and taking time out of your busy day with us.

**Max:** I'm honored, Sara. Thank you for having me.

**Sara:** Well, I'm super excited to get into this discussion. But I want to just really quickly introduce everybody to you, Max. For those that don't know, Max Lugavere is the director of an upcoming documentary film titled Bread Head, which explores the impact of diet and lifestyle on our brain health.

Max has established himself as a leading voice in health in just a short time since launching his Kickstarter campaign for the film, which drew support

from thousands of people from all around the globe. His video blogs, also known as vlogs, have garnered hundreds of thousands of views, where he delivers bite size blasts of easily digestible information on health and science topics ranging from intermittent fasting to the microbiome.

He's a Yahoo! Health expert and has spoken at the New York Academy of Sciences, the United Nations on Global Health, and has appeared on multiple top health podcasts and TV shows, including Bulletproof Radio, NBC Nightly News, and the Dr. Oz Show. That's pretty impressive stuff there, Max.

**Max:** Thank you. It's crazy to hear all of that read back to me in a sentence. It really has been a lot. I've just been so humbled and honored to be embraced by the community because it really is a community online of people that are trying to light a candle, so to speak, to help share the ways in which our diets and our lifestyles, the power with which they can affect our health. And so yeah, I'm humbled and honored to be a part of this summit, which I think is so important.

**Sara:** Well, Max, I know a lot of people out there want to know how to upgrade our brains. I can't wait to get into this. First, you have a very compelling reason why you're interested in this subject. And it comes from a place really close to

home. Can you share with us a little about your story, and why you're such a passionate advocate for brain health?

**Max:** Yeah, I've always been into health and nutrition my whole life, for as long as I can remember. I was an early adopter of many of the ideas that now for the first time I'm sort of starting to publicly talk about. But my professional life really has been largely media based. I was a host and producer for Al Gore's TV network, Current, back when that was a thing.

Then when I left Current TV to sort of discover new lands, my mom, from out of nowhere, started showing signs of cognitive decline. And that caught me off guard for many reasons, one being that she was obviously very young. And this would be a weird thing to experience in a young parent for anybody. But second because I didn't really have any kind of family history of cognitive decline, neurodegeneration, anything like that.

So I think people generally have a sense of what is in their family tree disease wise. "Cancer runs in my family." "Oh, heart disease runs in my family." But this idea of Alzheimer's, neurodegeneration, dementia, all of these terms that these days I seem to throw around wasn't even in my vocabulary at that point because it's just not something that was in my ancestry.

So I basically took a year off of work to really use my, I guess, penchant for understanding biology and health to really research, to come to some kind of conclusion as to why this would've happened to my mom and to understand whether it was temporary, what neurodegeneration is, the myriad of lifestyle factors and dietary factors that can sway a person in the direction of cognitive malfunction versus cognitive health.

And at first it was really, obviously, motivated by my Mom. But then this whole new door opened for me when I came across the idea that, for many people, these kinds of things are potentially preventable. So I just became obsessed with researching the ways that we might live to minimize our risks for cognitive disease, and ultimately, at the end of the day, as the title of this session alludes to, how I might optimize my brain and my cognitive performance.

And from day one it's always been very much backed in science, backed in the research. I think it's so fascinating. There was an AARP study done this past year where they found that 93% of Americans believe brain health to be of great importance yet have no idea how to maintain or improve it.

So there's really a gap in the collective knowledge base. And yet that insight and research is out there. So all I'm doing is I'm curating all the stuff that I am reading about hours upon hours every day and trying to sort of get that out there into the universe so that people become mindful of this stuff.

**Sara:** I love that. I love all the work you're doing. And I think it's cool that you're bringing it to light through video because I think it's such a powerful way of communicating. When you see it in action, it just makes all the difference. And I love how you're

kind of distilling it down and just giving us these bites, that we can kind of just watch your videos for a couple of minutes and really get some information.

But I think you hit the nail on the head. I think for years we've thought that our brain health is not really in our control. And things like dementia and Alzheimer's are things that just kind of "happen" to us. And when something like this happens in your family, and you didn't have that in the history, it kind of rocks your world.

We were talking about metabolism. I think a lot of times when we talk about metabolism, people immediately jump to weight. And of course it is responsible for that. But our metabolism is so much more than that. It's responsible for all the chemical processes that occur in our bodies to create and sustain our life. It delivers nutrients into our cells, our energy use, and the removal of waste, and growth and repair, and protecting us from disease.

So I think that's one of the reasons why I wanted to talk about the brain in relationship to our metabolism because when we're taking care of our metabolism and we're taking care of our brain, we're taking care of so many other things, and lowering our risk for many of these diseases. It also gives us a little bit more control, right? We feel less out of control.

**Max:** Yeah, it's so true. I think people tend to think about metabolism in the context of disease and metabolic syndrome and type 2 diabetes and things like that. But each and every one of us, we are metabolism machines. We are this amazing amalgamation of cells that are fueled by these mitochondria that initially existed as bacteria. And they sort of migrated into these eukaryotic cells, that's

according to the science, and established this, from very early on, symbiotic relationship. They even have their own DNA. Our species is capable of such incredible things. We just put a rover on Mars.

At the end of the day all of our cognitive processes are the result of this concert of metabolic functions. And I think that we really have to pay reverence to this underlying process that each and every one of our cells is doing day in and day out, and realize that when something is awry, metabolically speaking, we're going to have an effect in the way we think, in the way we view the world, and even in the way we view ourselves.

It's such a multifactorial process. And there are many things that we can do to either hurt or improve our metabolic health. So I just think it's incredibly important. We should be mindful of our metabolic health with every choice that we make.

**Sara:** I know. That's one of the reasons why I love taking this approach, is because it's so synergistic. Everything is so connected. And when you can heal the metabolism from the core, you're healing your brain. You're lowering your risk of disease.

One of the things I want to talk about is, I know you met with the doctor that coined the term type III diabetes in relationship to Alzheimer's. Let's talk a little bit about that. I know a lot of people, that's still kind of news to them, even though I think that was over five years ago that she came up with that term.

**Max:** Yeah. So basically, for a long time the brain was thought of as being separate from the body. And it turns out that by showing signs of insulin resistance in your periphery, meaning in the part of

your body below the neck, that has an affect on brain health. And these pathways, there are so many aspects of it. Insulin resistance is the hallmark of type 2 diabetes.

So you're not only inducing this resistance to this sort of feeding hormone to all of your cells, but this chronic elevation of blood sugar that goes hand in hand with this insulin resistance that we're talking about also has vascular effects.

And the brain relies on having healthy vasculature. The network of capillaries in the brain, that's the second most common form of dementia. Vascular dementia is the result of what they call mini strokes in the brain. So if you consider the fact that your brain is just completely saturated with this microvasculature, we realize that if we are type II diabetic, or if we don't mind our vascular health by making sure that our blood pressure is in check, that can damage the vasculature of our brains.

So the type III diabetes idea, which was coined by Suzanne de la Monte, she basically has found striking similarities in the neurons of Alzheimer's cells and the kind of metabolic changes that you'll see, for example, in the periphery with insulin resistance and type II diabetes, so much so that she coined type III diabetes to describe these sorts of similarities.

And the idea is not that type II diabetes causes Alzheimer's disease, but that the underlying pathology, they could be cousins of the same pathogenesis. And I thought that that was a really powerful insight. And it's an insight that she put forth this idea of calling Alzheimer's type III diabetes. But there are certainly a ton of other researchers that are looking at this sort brain body connection. And it's just fascinating because right now, there is no consensus

as to where Alzheimer's disease begins. And when I talk about Alzheimer's disease, I'm only talking about it because it's the most common form of dementia. It's not the only form of dementia. But it's the one for which this robust body of work exists. And that's because it's common.

But even outside of the brain they've found that insulin resistance in your body can predict amyloid buildup. And this amyloid hypothesis is one of the prevailing hypotheses as to where Alzheimer's disease sort of comes from. Amyloid is the initiating factor in this cascade that ultimately will lead to dementia.

But there are a growing number of neurologists and scientists that don't believe that it's amyloid, that it's metabolic in origin. And so I think that by being mindful of our metabolic health, that's where we can really do our best to minimize our risk for these diseases. And that's where, in my opinion, all the research in regards to type II diabetes comes into play.

So the fact that I'm not an MD—and I don't pretend to be a doctor—gives me the ability to look at sort of all of the research from a 30,000-foot view. And I think that's really important because it's not a secret that doctors don't get a lot of nutrition training. They don't get a lot of training in terms of exercise either. And exercise is a really significant way to not only prevent the kinds of diseases that we're talking about but to treat them. So I think that doctors don't get enough nutrition training as it is.

And then you take neurologists, neurologists that are in practice today went through medical school not believing that there was such a thing as adult neurogenesis. So the idea that our diets and our lifestyles can actually change the function of

our brain, there's just this complete deficit of insight where we most need it, when we're actually in that room with our practicing physicians.

And so to think that they would actually go and look at research in regards to type II diabetes, I think, is just a stretch all together. So that's where, to me, the research regarding type II diabetes becomes really sort of relevant because if we can look at the diet and lifestyle factors that might not only best prevent becoming a type II diabetic, but even treat and cure, ultimately reverse type II diabetes.

There's evidence that you put these patients on low carb diets, and they're able to come off their medications. To me, it makes perfect sense to connect those dots and to say, "Well, maybe that's a reasonably healthy diet for brain health, as well.

**Sara:** Yeah, I know. It's fascinating. And I think you hit the nail on the head with the disconnect between nutrition and lifestyle factors that's being taught in medical school. And I think, fortunately, that is changing. There are a lot of doctors that are either doing it on their own and realizing how critical it is, or they're going to programs that are functional and integrative in nature. And I think that's such a growing field, thankfully, because we've got to go back to Hippocrates, who basically was the father of medicine and saw thousands of years ago that our food is our medicine.

So, Max, what are some of the things that we should be aware of that are kind of the common insults to the brain. Obviously sugar, we've talked a little bit about that. Having too much sugar in our diet is definitely numero uno, right?

**Max:** Yeah, definitely. Sugar is the worst. And sugar takes many different forms, everything from



soft drinks to condiments. Sugar is hiding in some fairly unlikely places. I think we need to be mindful of that. But even things that we commonly consume that don't explicitly look like sugar still turn into sugar, some of them even before we swallow them, for example, wheat and starch and things like that.

We have this enzyme in our saliva called amylase, which begins breaking down these complex carbohydrates into sugar as soon as we start chewing them. And the biological processes that occur once that flood of glucose enters your system really is not that different when you compare what happens with a piece of whole wheat bread and pure table sugar, for example.

So I definitely advocate for a low carbohydrate diet with the caveat that we're now starting to understand how vital a role our microbiome, the community of 100 trillion microorganisms that live in our large intestine, play in our health.

So I think a lot of people, when they hear me talk, they think that I'm recommending a zero carb diet. But really, we need to do our best to get as much fiber as we can. And I recognize that occasionally that'll lead to choices that are a bit higher on the carbohydrate spectrum.

But the point is that we don't need to go out of our way to consume sources of carbohydrate. We get enough blood sugar from vegetables. Spinach is a source of carbohydrates. There are many functional fruits that I think are really healthy, berries being one of them. But in general I think eating a low carbohydrate diet that's high in microbiota-accessible carbohydrates, soluble fiber, things like that, I think that's key.

In terms of metabolic health, I think that we're seeing that the choices that we make can change our metabolic health at the level of the gut. So things like artificial sweeteners, sucralose, aspartame, those have been linked to reduced insulin sensitivity. And that's mediated by our microbiota. So I think that this is all really interesting and relevant.

And it's important to remember that fat doesn't affect your blood sugar at all. So healthy sources of fat, I'm a huge fan of extra virgin olive oil. Extra virgin olive oil is like medicine. In Italy food exists as a vehicle for extra virgin olive oil. And the Mediterranean diet, you can't argue with the fact that it's a dietary pattern for which there's a decent amount of evidence that it's cardio- and neuroprotective.

**Sara:** I was just going to say the nice thing about eating fat is it does keep your blood sugar level. And it makes you more satisfied, whereas simple carbs spike your blood sugar. And that makes you hungry. I always say that pretzels used to be my sugar because they spiked my blood sugar. I may as well have been eating a candy bar. Pretzels are like 70 on the glycemic index, or 80 or something like that.

So, yeah, I may as well have been sitting around eating candy. But I was eating these pretzels and constantly hungry. So everybody's sugar can be a little different, right?

**Max:** Yeah, definitely. Your average slice of whole wheat bread has a higher glycemic index than table sugar. That right there is frightening. Before really starting to dig into this research, I was a big brown rice fan. I would eat, with my Thai food, a huge bowl of brown rice and just drench it in the Thai curries, which I love. But that's a huge amount of blood sugar that you're ultimately feeding

into your system. And if you eat that for dinner, for example, and then you go home, and you're sitting on your couch, you're inundating your system with this sugar that has nowhere to go but into either your fat stores or your liver. And in the process what you're doing is you're glycosylating all of the constituent proteins that you're made of.

Again, going back to vascular health, I think that it's just really damaging. So eat a low carb diet high in healthy fats. I'm a big coconut oil fan. I also like to remind people that diet is just one part of the insulin sensitivity story. Getting poor sleep has been linked to insulin resistance. There are things that you can do day to day, obviously, that really can have a lasting impact on your insulin sensitivity. Exercise is by and far one of the greatest things that you can do for your metabolic health, both in your body and your brain, which—who knew?—are connected.

I like to dig into more obscure studies. I found a study recently that showed that they used intranasal oxytocin. And that was found to increase insulin sensitivity. Oxytocin is the hugging hormone, essentially. You express higher levels of oxytocin when you're, say, cuddling with somebody that you care about. So imagine that cuddling improves your insulin sensitivity. That's just a crazy thing to conceive of. But there's evidence to show that that might be the case.

**Sara:** That's amazing. It really is. You can't distill it down to one thing. I think there are so many aspects of our life style that are affecting our brain. I know myself, when I haven't slept well, not only is my brain more foggy the next day, but your hunger hormones get out of whack from lack of sleep. And your blood sugar regulation is not as effective. I always describe it as dominoes.

The metabolism is kind of like a set of dominoes. If one of them falls down it's going to pull the rest of them down. And then you've got to reset them all up. So that's why when we think about the body as being this more synergistic thing, one of the worst things we can do for our brain or health is sit. And it's one of my things that I have on my list for Christmas. I want a standing desk because I sit for my work. And I've noticed that it really can affect me.

**Max:** Yeah, being sedentary is definitely not good. And I think it's possible to be sedentary while you're standing, as well. I don't think that standing all day is necessarily the answer. But we need to be more active. And the benefit of being more active is that we provide ourselves with these substrates for carbohydrate to go into when we do choose to consume more of them.

So if there's something that I really want to treat myself to, and I do occasionally because I do have a sweet tooth, I'll exercise beforehand because by exercise you're depleting your muscles of glycogen. So therein you're creating this substrate for the sugar that you consume to go to. The glucose that you consume will then go to sort of refill your muscles with glycogen.

If you practice intermittent fasting, you allow your brain to use some of the glycogen that's stored in your liver. Your liver is like the backup battery for your brain. Then you go and eat a piece of fruit afterwards, an apple, for example. Fruit sugar, fructose, preferentially glycogenates the liver. That's cool. You're allowing yourself the ability to do that.

But by being sedentary, by having these livers that are stuffed with stored sugar and our muscles stuffed with stored sugar, then throwing the 7 to 12

servings of whole grains a day that we're told to eat on top of that, that is just adding insult to injury, really. And as you said, this kind of stuff is really cumulative and self-perpetuating. So we need to, I think, start as early as we can to be really conscious of this stuff and where the carbohydrate that we're consuming is going.

**Sara:** Well, I love how you bring that up, that it's never too early to think about our brain health, is it?

**Max:** No, definitely not. They've found that changes begin in the brain decades before the first symptom when talking about things like Alzheimer's disease. And the second most common neurodegenerative disease, Parkinson's disease, by the time you present with your first symptom, half of the dopaminergic neurons are already dead.

So I'm not saying I have the answer as to how to prevent with 100% certainty any of these diseases. But the earlier you really start to get your metabolic health in order, the better. And aside from thinking about this stuff in the context of disease, it's really about optimizing your cognitive function as well.

People with higher levels of blood sugar but below the level of type 2 diabetes, they perform worse on memory tests. So this is all stuff that's going to really, day to day, in real time, better arm you to deal with the realities of modern life. Information is flying at us 24/7. I'm of the philosophy that if there's something that we can do to sort of optimize our cognitive function, then we should be doing those things.

**Sara:** You bring up such a good point. Your blood sugar doesn't have to be in that diabetic or even prediabetic range. And unfortunately many people will go

to their doctor, get their annual blood work done, and be sent home with a blood sugar of 105. Oh, you're normal. And it's levels even below that that, you're right, we're seeing issues that are far reaching throughout the whole metabolism. So I think it is something to think about. Rather than looking at disease care and the absence of disease, it's reaching for that optimal health and knowing that you can get there. I think that's a big one, is that it's achievable. And it just takes each step.

One of the things I think about a lot of times is I worry about kids today because by the time kids are 8, they've eaten more sugar than someone ate in a lifetime 100 years ago.

**Max:** Wow, that's crazy. Yeah, it's terrifying. I posted a study yesterday that came out. If you cut toddler's sugary drinks, you can improve their cardiometabolic health at age six, which is crazy, to think that you can modulate your cardiometabolic health at age six. But there's actually an association here being drawn between consuming lots of sugar at one year of age and its impingement on your health at age six.

So, again, just going back to how cumulative all this stuff is and how easily the cascade that will ultimately look like insulin resistance, how easily that becomes a self-perpetuating vicious cycle that just builds on itself, greater levels of insulin resistance leads to more circulating blood sugar, which leads to this glycation process.

Obviously you diagnose diabetes and prediabetes with the A1C, which is a three month average of blood sugar. That glycation that's happening in your blood is happening throughout your body. It's just that it's easy to measure in your blood.

And the oxidative stress, glycation is a major source of inflammation. So we're not immune to this stuff. We're certainly not immune to it when we're in our 20s, 30s, and later in life. But it turns out now, being one year old can have an impingement on our metabolic health at six. That's just crazy to consider.

**Sara:** It's so crazy. You have a really good vlog on your website about slowing down our biological clock. I love that. I think we can take this metabolic approach of healing the body in this way. And sugar is one of the biggest insults to aging. That glycation creates this thing called AGEs, advanced glycation end products, which create wrinkles and damage our collagen. So when we think about making these changes, you can't control the chronological age you are. But you can control, in a lot of ways, your biological clock.

**Max:** Yeah, definitely. I'm a huge believer of that. And I see this in my peers. I see people that are my age that look older. And granted, a lot of my friends have jobs that are a bit higher in stress. But we can accelerate or decelerate our own biological aging process by way of the choices that we make.

And a lot of the choices that will lead to a more successful aging, biologically speaking, are exactly the kinds of things that we're talking about, that we've been talking about: reducing your carbohydrate intake, especially sugar, refined carbs, processed foods, things like that; eating a diet that's higher in healthy fats; getting adequate exercise; not being sedentary; and getting sleep. These things not only will decelerate the rate at which you age biologically, but at that rate, that true biological age is going to be reflected in the way you look.

Think about how disruptive that is to the cosmetics industry. It's just

crazy to think that what matters more for the way you look on the outside is what you're putting into your body. But to me it makes complete sense.

I'm glad you liked that video and the videos in general. When I did the Kickstarter campaign for Bread Head, I began vlogging just to establish this dialogue with the Kickstarter supporters. And I've really enjoyed keeping up with them. And they've become increasingly focused less on providing updates on the film and more about just kind of talking about these ideas. So I'm super happy that they resonated with you.

**Sara:** Yeah, they're great. I think they're real digestible and easy to just fit in your day. And they're really informative. I definitely recommend that people follow you on Facebook and check those out.

And, by the way, congrats on Bread Head. I think it's so amazing the kind of response you had with people and getting it funded through Kickstarter. It just shows you how many people's lives are touched by issues with brain health and how many people really want to see this come to fruition.

**Max:** Yeah, we all have brains. We are all vulnerable to these kinds of diseases. As I can attest to just because of my own story with my mom having really had no sense of this being in my family tree, you don't need to have a specific gene to experience problems with your brain.

So I'm just trying to get this information out there because I think it's really so important, even in terms of mood. Putting memory aside for a second, the foods that we eat affect the way we view the world. I know that depression is a massive problem. There are millions upon millions of people

in this country that struggle with depression. Depression is a terrible thing. And we tend to be really quick to reach for these drugs that boost serotonin levels in the brain.

But for many people, the source of depression could be something like gluten, in a case of non celiac gluten sensitivity, which is massively underdiagnosed. The studies, obviously, have been done with these refined carbohydrates. But eating lots of carbs has been correlated with increased rates of depression. Studies have been done with refined carbohydrates.

But if you look at cardiovascular risk factors, even though intuitively it makes more sense to focus on low glycemic carbohydrates versus higher glycemic carbohydrates, the studies have actually failed to find a real meaningful difference, whereas going lower carb all together has been found to vastly reduce cardiovascular risk.

So I'm making a leap for sure. But I think that by watching our carbohydrate intake and cutting out all these refined carbohydrates that are so abundant in the American diet we can improve our mood. These are all the things that I think people should know about.

**Sara:** I think without a doubt there's so much truth to that. I personally have experienced that myself, having finally, a number of years ago, gotten the gluten out. It literally had a profound effect on my mood and my brain function and chronic inflammation throughout my body. Aches and pains that I thought were just normal for me just finally resolved.

So I definitely think that there's a big gluten thing. Whether it's the wheat, the gluten, what they're doing to the wheat, I'm not really 100% sure about yet. But, yeah, there's a big connection.

What are some of the things that you do every day to really optimize your brain health, some foods and different things that you like to share?

**Max:** Well, I love to exercise. I'm a big workout junkie. I don't like cardio. But I do it for the neurons, I say. I've become a fan of the elliptical. It's the one means of cardio exercise that works for me. But I do really enjoy lifting weights. And there is research to show that resistance training does boost working memory.

So I try to get in some weight training sessions three times a week. That seems to be what works for me. I also really enjoy yoga. Yoga has been found to boost working memory, as well as these neurotrophic factors in the brain that essentially are like the guardian proteins of your neurons.

I like to employ intermittent fasting. The idea is that with intermittent fasting you can sort of reap some of the benefits of calorie restriction without actually depriving yourself of calories. So I'll do that. I will eat my calories between noon and eight p.m., for example, and then fast from eight p.m. until noon the next day. And that provides sort of a 16 hour window in which you get to deplete your liver of the stored sugar, glycogen, that we were talking about and allow your brain to use ketones for fuel. Your brain will use ketones when they're available. But seldom do we allow our brains to do that. And ketones are actually a much cleaner burning fuel source for the brain than glucose. So that's really beneficial just in terms of brain health.

But you asked about optimizing your brain. Studies have been done that have found that we actually make more advantageous decisions when we're hungry, when we're fasted. And so I will do this

intermittent fasting protocol—I did a video on this, as well—if I have meetings, for example, or even when I want to do a new video.

A lot of the videos that you've seen on my Facebook feed, they seem sort of fast. I feel pretty sharp when I'm doing them. And most of the ones that you'll see on my Facebook page are done while I'm fasting, during one of these fasting windows. So in terms of metabolic health, fasting has been shown to be really good. You can boost insulin sensitivity, things like that.

**Sara:** There's a ton of research around intermittent fasting. It's definitely a movement that a lot of people are jumping on because it is an easy change that you can make. I know some people that are in what I call a sugar roller coaster mode, where they have the highs and lows, and they're crashing if they don't eat every couple of hours, they need to do some work to get to the point where they could put their window between noon and eight. For people who have adrenal fatigue, that may not be ideal, as well.

But for people who can go that time period, eating, like what you described, plenty of healthy fats to keep their blood sugar stable and getting their high quality plant based foods and quality protein, that can help level them off. I put it in my book, in my metabolism hacks. You can kind of hack your metabolism that way.

**Max:** Definitely. I'm really into the hacks. I think that's a great way to put it.

There are certain foods that you can eat that have been found to increase symptoms of insulin resistance. Cocoa flavanols, for example, have been shown to do that. So yeah, there are so many tools at your disposal. It's really fun

to sort of tinker and see what works for you.

I also think, just going back to intermittent fasting, if anybody really wants to dig in, there are two major researchers in this field. Mark Mattson, down at the NIH, he does a lot of really great work, particularly, I think, with mice. He's been doing this kind of research for a long time.

And then Krista Varady, I think she studies intermittent fasting. And she uses human subjects. She does a lot of really great work in that space as well. And I know that there's a lot of authors who've sort of taken these ideas and extrapolated.

To me it's as simple as knowing what happens to your body over this 12-hour window, and that it takes about 12 hours to deplete your liver of glycogen. That, to me, is reason enough to just sort of let yourself go hungry every once in a while. Intuitively it makes sense. We all talk about the paleo diet and what that might look like. And I think we've got a pretty good sense. I really appreciate the paleo diet's focus on food quality.

One thing that we can all pretty much agree on is that we didn't have supermarkets and Seamless back when we were evolving on the plain. So to me it intuitively makes sense that by allowing ourselves to go hungry a little bit every once in a while we get to turn on these hardwired sort of mechanisms that actually will boost our own ability to think and to be clever because that's really what it would take.

Think about it from a Darwinian perspective. That's what it would take to get us from feast through the famine to our next meal. So that's why it just makes perfect sense that we might be potentially at our most clever when we're hungry. And there are a lot of



variables that could make this intermittent fasting easier or more difficult on an individual basis. You mentioned adrenal fatigue. If you are diabetic, especially if you require insulin, you absolutely want to check with your doctor as to whether or not this is safe for you. But in general, I think it's pretty helpful.

**Sara:** I'm sure you've seen that Israeli study where they looked at the policemen, Israel policeman. And they ate the same amount of calories, did the same kind of exercise. And the ones that ate in I think it was an eight- to ten-hour window had better blood markers, lost weight. And they were eating the same things pretty much. So, yeah, there's definitely research and I think a lot more information coming out about that.

I know you talked about olive oil and coconut oil. I love coconut oil. I think it's really, really great for the brain. What about omega 3s? Do you use omega 3s for your brain?

**Max:** Yeah, I think omega-3s are really important for a variety of reasons. I think that they're important for the health of your microbiome. There was a study that came out about three weeks ago that looked at the effect of saturated fat versus fish oil on the microbiota and obesity related changes in the microbiota.

So no human eats like this. But they found that in mice that were fed a diet exclusively of fish oil versus exclusively of saturated fat, the saturated fat diet led to this overexpression of these obesity related changes. Yet in the context of a fish oil microbiome, they basically transplanted the microbiomes of the fish oil fed mice, and fed those mice with the fish oil microbiome saturated fat.

And they found that they were protected against those changes. So I think that fish oil very clearly has been shown to benefit your microbiome. These fats are anti-inflammatory. And there are a multitude of ways in which they provide that anti-inflammatory effect. But in regards to just specifically optimizing brain health, your brain is made of DHA fat.

So you want to provide your brain with these really vital building blocks. DHA also can boost BDNF in the brain. I mentioned BDNF before. It's one of these neurotrophic growth factors that's really important for promoting neurogenesis, the creation of new brain cells, and protecting existing ones. DHA has been found to reduce depression, symptoms of depression. And depression recently has been linked to inflammation.

So there are probably a few ways in which it's having that effect. Obviously omega-3s are anti-inflammatory. But then also they boost BDNF, a deficit of which is associated with depression. So you know, Sara, metabolism is really complicated. All these pathways are so multifaceted. And there could be a million ways in which fish oil benefits the brain.

But really I don't think there's any question that incorporating more of them into your diet, especially in the context of the standard American diet, which is sorely deficient in these kinds of fats, will be helpful.

There was a study that recently showed that two and a half grams of fish oil a day dramatically slowed the rate of progression in patients with mild to moderate Alzheimer's disease. So even if you don't have Alzheimer's disease, obviously this fish oil is doing something really important to the brain. So I can't recommend fish oil highly

enough. I think it's really one of the best things that you can take supplement wise.

**Sara:** I'm sure you've heard of that mouse study where they had three groups of mice. And they put them in a maze. One was getting fed fructose. Another one was a control. They found that after they'd had fructose, when they took them out and put them back in, they'd forgotten how to get around. So yeah, it is amazing.

One of the reasons I actually became a nutritionist was because I hadn't used omega 3s. And I started taking chia seeds every day. And not everybody converts chia seeds well into the active DHA EPA. But there is still a positive omega-3 effect on the brain and mood. I find omega-3s to be very protective of our mood. Have you ever used chia seeds yourself?

**Max:** Yeah, I love chia seeds. I think that ALA, the plant form of omega 3, probably has its own highly beneficial effects on the microbiome and things like that. I tell my friends who are vegan that it's still really important to make sure that you're getting adequate EPA and DHA. The body does have some capacity to convert ALA.

But it's really, really limited. In fact I was reading a book the other day. And I took, actually, a photo of the page where they had a diagram. The conversion rates are so miserably small. So in healthy young women, 21% of ALA is converted to EPA. And 9% is converted to DHA. So right there you see that if you are a vegan, and you're not consuming adequate EPA and DHA, you are sorely missing out.

And there are plant-based forms of this sort of preconverted EPA and DHA. And that usually comes from algae. But I think that ALA probably

has its own benefits. So I love chia seeds and flax seeds. They're also a great source of fiber, again, going back to the microbiome.

**Sara:** Yeah, it's one of the most unique forms of fiber because it's so hydrophilic, soaking up about 10 plus times its own weight in water. And so it makes that gel. It's a fascinating food.

So I want to get a really quick update on where you are with Bread Head. I think it's so exciting. I know you guys are working real hard on it.

**Max:** Well, we are filming. We were shooting yesterday. We're shooting tomorrow. And next week I am going to Europe to shoot for Bread Head, which I'm really excited about. We're going to be in Stockholm and Helsinki and Berlin shooting for the film. So it's a global journey to uncover the truth. I'm just so excited. And it's challenging.

The Kickstarter ended about eight months ago. And I kind of thought that it would be a faster process. But we're really taking our time to make sure that we can put out the best film that we can. If we just wanted to string together a bunch of interviews, we could do that already at this point.

But I think that it's really important for me and the producing team that I'm working with that it resonates, as a film should, emotionally and whatnot. I think too many documentaries are just interviews strung out. I always like to underpromise and overdeliver. But I think that we've got something really special with the film.

So we're kind of just taking our time in making it. We're looking for an editor. So we don't really have yet the editor locked into place. We've got lots of interest. But making a film, it's a beast. There are so

many moving parts. It's almost like metabolism.

**Sara:** There are a lot of synergies and a lot of things that have to come together, I'm sure. What an amazing journey. I know that you just live and breathe this stuff. You're passionate. You read PubMed for fun.

**Max:** Yeah, I try to convey some of the wonder that I feel about our own biology with the videos that I do on YouTube and Facebook. I think it's really so cool. I tend to go on these I call them nerd safaris because I'll have five different pdfs open, all these different studies. And each one of them has 100 different references that I then love to go and search for.

And there's really no end. This is all so complicated. And how complicated it is, is matched only by how fascinating it is. So it's like this confluence of just opposing forces. And sometimes five hours have gone by, and I'm still on PubMed trying to figure out the way fats affect postprandial endotoxemia. It's so interesting.

**Sara:** It is complicated. And that's one of the reasons why I think what you're doing is so great because you're simplifying it for everybody. You're putting it into these two minute vlogs that people can distill out the information to really help affect their brain health and their overall health. So thank you for all that work you're doing and the free information that you are continuing to put out.

**Max:** Yeah, of course. Information should be free.

**Sara:** Max, if you could look into a crystal ball and see yourself 10 or 20 years into the future, where do you want to be? What do you want to see?

**Max:** That's a really good question. I don't know. I like media. I know that. I like telling stories, irrespective of medium. I know that personally I've dabbled in music. I do web video. I've done television. I like it all, really.

So I'd like to just continue telling stories and being a voice for this. I'd like to tell stories that act as a catalyst for change, particularly where our health is concerned because I think that all we really have is our health. Disease is really terrible. And it's really hard to undo a decades-long disease process, as is the case with many of these chronic diseases that we always talk about.

So I'm just really thrilled to be a foot soldier, like you are, on the ground, just helping disseminate the truth about these diseases and how we might live to be healthier, and offer my unique abilities in this space, which are my storytelling abilities, my media savvy or whatever that is. I feel like that's really what I can offer the field that maybe isn't currently being done. There's no limit to the level of complexity of this material that I find to be really fascinating.

I think that one of the biggest problems is translational medicine. It's getting this information out to the people in a way that is not sensationalized but just simplified in a way that makes sense and that gets people sort of excited about the possibilities. So I want to do that through media if I can.

**Sara:** Well, I definitely think you're headed there. And you're going to be successful. I'm really excited to see Bread Head come out. I definitely encourage everybody to get over there. And if you haven't already, check out the trailer for it.

Just the trailer in and of itself is so powerful. It definitely makes you

feel for everybody that's going through cognitive decline. A lot of people out there are experiencing this in their own family. So I know that you've got a bunch of people behind you loving what you're doing.

**Max:** Well, thank you, Sara. Thank you for the incredibly kind endorsement.

**Sara:** I just want to say, Max, thank you so much for being here with us today. We could probably talk for another hour or so. But I know you've got a busy day going. So I really appreciate you taking time out of that busy schedule of yours to help us understand and make it simpler, this complex relationship between our brain and metabolism.

**Max:** Well, I'm honored to have been here. And I wish you all the best for the summit. I can't wait to spread the word.

**Sara:** Thank you. Well, everybody, thank you so much for joining us for the Metabolism Summit for this session. I'm your host, Sara Vance. I'm so passionate about this topic because I've been on the other side of health and suffered metabolism problems and digestive issues and mood and all those kinds of things.

So I really am passionate about connecting you with experts like Max, who can give you the information to help you regain control of your metabolism, weight, and achieve the optimal health that you deserve. Thanks, everybody.



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