

# Deep Nutrition: Why Your Genes Need Traditional Food: A Special Interview With Dr. Cate Shanahan

By Dr. Joseph Mercola

**JM:** Dr. Joseph Mercola

**CS:** Dr. Cate Shanahan

**JM:** Fat: An essential part of your diet. But how do you know it's high-quality fat? Hi, this is Dr. Mercola helping you take control of your health. Today we are joined by an expert who is going to answer that question in a very deep dive. Her name is Dr. Cate Shanahan.

Dr. Shanahan is a family physician like myself. She has written a really magnificent tome, *The Deep Nutrition: Why Your Genes Need Traditional Food*. It's been out for a while and recently revised. She is in the process of actually writing a new book. She has served as a consultant for the Los Angeles Lakers. She's really an articulate advocate for some powerful nutritional principles that we'll discuss today. Welcome and thank you for joining us.

**CS:** Thank you for having me on. This is very exciting.

**JM:** Yes, indeed. I'd like to delve a little bit into your story on what catalyzed your journey into this area of medicine, which is different. It seems like the majority of clinicians from my experience do have some type of personal experience like yours is. I didn't. I was just always passionate about health. Not that it's good or bad. It just was my focus since I was a little kid.

But you got sick in 2001. You did a deep dive into studying biochemistry and molecular biology, which I think are absolutely essential to today's tools. You tried to figure out what the connection was between your health problem and your diet. It didn't reconcile with what you were being taught in school. Why don't you discuss that journey? Because I think it would be very beneficial for many.

**CS:** Yeah. I was practicing family medicine in Hawaii at that time. I had gone to medical school with this fantasy that I would get to the underlying cause of diseases, particularly, selfishly, the ones that I tended to get as an athlete, which were connective tissue problems. I had bursitis and tendonitis and every other -itis. I was always doing more stretches.

**JM:** What was your sport?

**CS:** I was a runner. I did long-distance. I actually had a scholarship. I actually qualified for the Olympic trials.

**JM:** Wow.

**CS:** The 1,500-meter race. Yeah. I didn't even know that was like such a big honor. I was like so out of it as a teenager. My brain was focused on running. I really didn't even know much about the rest of the world.

**JM:** A sub-five-minute mile for sure, huh?

**CS:** Right at five minutes.

**JM:** Okay.

**CS:** I was probably like the last dregs that got qualified.

**JM:** It's still an impressive honor. Congratulations. That's great.

**CS:** Thanks. In 2001, while I was in Hawaii, I developed this problem in my knee where I ended up not being able to walk more than just a few steps without getting pain, swelling and fevers. Going from being a pretty high-level athlete, exercising an hour or two a day, to sitting on the couch and just being couch-bound, I felt like my life was over. I was like, "No one could help me." I didn't know what was wrong. I had had surgery. I'd gone to so many specialists and nothing helped.

It wasn't until my husband said maybe it's this sugar habit that you have where you spend a lot of time creating this confection so that I could put enough sugar in my coffee to get the right flavor. It was actually a quarter cup of sugar and the caramel sauce. It was a lot I needed. I would do things like if I went for a 10-mile run, I would polish off a bag of M&M's, the palm-sized bag. I was like, obviously, it's not hurting me because I wasn't particularly overweight. I have to say particularly overweight because women are always overweight.

Yeah. He actually physically handed me a book so that I could start reading it, because I was so stubborn. The book he gave me was Andrew Weil's *Spontaneous Healing: How to Discover and Embrace Your Body's Natural Ability to Maintain and Heal Itself*. What Andrew Weil pointed out in there was – the phrase that got me — was talking about omega-3 fatty acids and how they're like vitamins. That completely blew my mind because I thought fats were bad for you. I thought they were all the same. I didn't know there were essential fats the body needed for anything in particular that we couldn't make.

I was so inspired by that idea. Actually, I was just intrigued. Forget about helping myself, I was like, "What? There are fats that are good for you? What is this?" Even though I couldn't walk, I flew to Oahu. I had to get a wheelchair through the airport so I could go to the medical library that was on Oahu, because this was 2001-ish. We didn't really have Google. Amazon didn't deliver to Hawaii at that time.

**JM:** It did. It was just very slow. It would take a week then. Three days of flying, that's for sure.

**CS:** Yeah. But I don't think we could even get it.

**JM:** Okay.

**CS:** Yeah. I tried because I really didn't want to get on the plane, but I did. I got like three textbooks about fatty acids and biochemistry. I read them cover to cover. By the time I was done, I realized there was so much more to the science of the nutrition than what we had learned, particularly because we were messing with our food supply. What we were eating was not straight off the farm by any means.

The thing that everything hinged on was – that I was a true believer [of] – that saturated fat was bad. Saturated fat was the devil. Cholesterol, you shouldn't have any. Polyunsaturated fats, vegetable oils and margarine were actually good for you. Remember in 2001, we didn't really know about trans-fats. It wasn't in the public eye. Just the same way that omega-3 fats, which every first grader learns about, were not in the public eye. I couldn't believe it. I was like, "What on earth? How could we be so wrong? How could all of medicine be so wrong?"

In order to convince myself, to explore it, I read whatever I could get my hands on online. The thing that helped me understand the key concept, the key principle, was oxidation of fatty acids. There was a Ph.D. thesis that was online by Eva Södergren. I have to shake her hand one day, wherever she is. University of Uppsala, I think it's [in] Sweden.

She explained how the molecular pathways of how polyunsaturated fatty acids actually react with oxygen and create a free radical cascade that turns normal fatty acids in your body into dangerous high-energy molecules that fly around, that are bad for us for the same reason radiation is bad for us. It was that understanding that was the entry point into my thinking that, "Oh my god. I have to write a book. I can't keep eating the way I was eating. I have to find out what to eat. What is a real diet supposed to be?" All of that was in my head at once.

I started listening more to my patients who were really into cooking, because I had already noticed that the 65-year-olds in Hawaii were a way healthier population than the mainland where I had left. I had also noticed that they were really into cooking. Previously, they'd start to talk about, "Oh, we had this buffet. I made this and that and the other." I was just like, "Yeah, yeah. Whatever. Tell me how much of your beta-blocker you're taking." After, I was like, "Really? Tell me more. How do you get the pig's blood?" I just started asking them questions.

I realized that, really, the key thing was their connection to nature. They were in touch with everything. They were hunting. Their husbands were hunting the pigs. They would fatten the pigs in the backyard before roasting it in the imu. That's traditional Hawaiian style. Or if they were more Filipino, they would raise them in some other scenario and they wouldn't roast them in the traditional underground oven.

This traditional underground oven in Hawaii is where when you go to a luau and you get that yummy pork that's like so soft it's falling off the bone. That's from the underground way of cooking it, traditional Hawaiian style. The Filipino [style] was to butcher, more like you would see in Europe, use the blood for making this one kind of meal, use every single part of the animal, and then they would eat everything. The same with goats that they would hunt or raise. The fish, they would actually save the fish guts and start fermenting them under the counter for six months. It sounds disgusting, but that's actually the secret ingredient [in Filipino cuisine].

**JM:** From my experience – I spent many winters in Hawaii before I settled in Florida. If you realize, that was a much wiser strategy and a lot easier to commute to places.

**CS:** Yeah.

**JM:** This is true for the older Hawaiians. But the younger ones, boy, they are just Americanized. They're probably even more obese than most Americans.

**CS:** Absolutely.

**JM:** Unfortunately, they've abandoned their traditional roots. But I wanted to comment on your experience as a runner and eating all that sugar. It seems to me the obvious issue is that you were burning sugar as your primary fuel, which most people in the country still are doing. The premise of your new theory now is that you need – and I totally agree with this – 60 to 85 percent of your diet as fat. You hit the target right on the ratio. I couldn't agree more. That's exactly what I recommend too.

[-----10:00-----]

But it takes a while to make that transition. That was the issue. You need more fat and burn it as your primary fuel, and because you weren't, you were causing mitochondrial dysfunction, which decimated your health. Your mitochondria produce adenosine triphosphate (ATP) and energy. Of course you wouldn't have energy because your mitochondria weren't working too well. I talk about that a lot in my new book, *Fat for Fuel: A Revolutionary Diet to Combat Cancer, Boost Brain Power, and Increase Your Energy*.

That's really why I wanted to have you on today, because you have just done such a magnificent job of diving deep on this issue and really going and exploring the details, because it's not just any fat. As you mentioned, these vegetables and trans fats. Most people know, of course, now that that's the case. You know what? People did too. Dr. Fred Kummerow, who's still alive. I think he's 100 or 103 [years old] now. He knew about these things 70 years ago. It wasn't unknown. It just wasn't widely known.

**CS:** Richard Simmons was on-board.

**JM:** Oh, yeah. Mary Enig with the Weston Price Foundation, and others. We're promoting it too. But the issue is it wasn't widely known. It is now. It's a great thing. But still, the devil's in the details. You do really such a great job in your book in discussing this. In fact, you went to the point where you said, [instead of doctors saying] "You need surgery to save your life." People would hear, "You need to get off vegetable oil and sugar immediately." But it's just amazing. People don't do that. They'll go for open-heart surgery and let a surgeon crack their chest open to clean up their blood vessels when they don't have to do something that's so radical.

One of your primary hypothesis or positions in the book is the toxicity of this vegetable oil. Why don't you start on that because you do such a good job of expanding on that?

**CS:** The vegetable oils are like soy, canola, palm, corn and there are a few others. They are actually extremely common in the average American's diet. Most people, when I say vegetable oil is bad, their response is, "I cook with olive oil." But the fact is that the statistics show that the average American gets somewhere between 30 and 50 percent of their calories from these oils, because it's not what you cook anywhere near as much as what you buy.

Vegetable oils are in salad dressings. They're in the restaurants, even the fancy restaurants. They can be labeled organic. A lot of people who shop at Whole Foods or always buy organic think that they're safe, right? They're buying what must be healthy oil. But no.

The reason that they are bad, the reason these fats are bad has to do with their molecular structure. They're the kind of fat that if you've heard of saturated fat, that's like animal fat. Fat and butter are supposedly saturated fat. I'll explain why I'm saying "supposedly," because they're always blends [of various types of fatty acids] in different proportions. But the olive oil is monounsaturated primarily.

These vegetable oils are [primarily] polyunsaturated. That just means that they have two double bonds in their... that's just about the chemical structure. But that chemical structure has very important consequences for how these oils change when we manipulate them for processing, refining as we do to put them in the bottle, and then again when they're cooked with, like in the restaurant or in manufacturing plants when you get your "healthy" granola bar, your "healthy" food bars, and then of course if you were to cook with it at home. One of the worst places is the deep fryer.

What they do is they degrade to the point where the bottle will contain toxins. The polyunsaturated fat itself isn't bad for you, unless you eat too much, which we [also] do.

**JM:** Right. That makes sense.

**CS:** The other issue is that it's just bad for us because it degrades. It's just going to degrade more and more the more you do to it. If you just have corn, soy, sunflower or any of these things [in their whole food form] that they extract these oils from, it's fine, as long as you're not getting way too much. It's not unhealthy. It's actually an essential fat, so you do need some in your diet, maybe somewhere between 1 or 2 percent of your calories of both the omega-3s and the omega-6s. But the fact is that now, we're getting probably five to 10 times as much as we need. That amount is toxic [because the molecules degrade in our bodies] and [because the processing itself creates toxins and] then [more of] those toxins develop as we heat these oils [to make processed foods]. They're a double whammy.

If what I just said makes your eyes glaze over, then you've answered the question as to why you haven't heard this before. Because it's complicated chemistry. There's a lot that's going on. There are a lot of steps involved to explain how it's clinically relevant. It is when you look at your cholesterol particle sizes. This is one of the things that I talk about at length in chapter 7 of *Deep Nutrition*, which is how these polyunsaturated fats consumed in excess and the toxins that they contain affect your body's lipoproteins to cause arteriosclerosis. I don't know if you want to discuss that.

**JM:** Well, we can. We've actually discussed that in previous interviews. But I'd like to go more into these toxins, because these are highly perishable fats that tend to oxidize and go rancid essentially. But then when you heat them, they form even worse things. They certainly can form trans fats if they're heated high enough, especially with a catalyst. But they can also form cyclic aldehydes. Thanks to Dr. Kummerow's lawsuit actually, it's actually catalyzed the Food and Drug Administration (FDA) to ban these trans fats. But now, they're substituting even worse fats than trans fats.

**CS:** I know. Food scientists are always a step ahead.

**JM:** Yeah. What I really want to ground people on is to understand the basics. Because once you understand the basics, then you can avoid all this garbage. The key is the processed foods.

Actually, in your book, you talk about Ancel Keys and really how he was the villain who was commonly acknowledged as creating the popularity of the low-fat diet. But he did it in a rational response because there was an epidemic of heart disease in the early 20<sup>th</sup> century, but he vilified the wrong item. He vilified saturated fat instead of the vegetable oils they were using. He had them replaced with carbohydrates. That was just crazy. Now, we've got to go back and correct that.

**CS:** Worse.

**JM:** Yeah. He made things worse, but he just was mistaken. Plus, he was funded by the sugar industry.

**CS:** Don't forget, how he made his bones. He made a name for himself with processed food because he created the K-ration, which is how the military was fed in World War 2, which was essentially our first foray into processed food on a massive scale. I don't know what the connections were. I'm sure there are journalists out there that can do some fascinating stories about that. But I just feel like there was always something kind of a little more than just innocent blunder about the consistent hiding of the truth that Ancel Keys is responsible for. I feel like he's kind of a bad guy. I talk about that [in Deep Nutrition]. Yeah.

The curve of cigarette smoking per capita and deaths from heart attacks per capita match perfectly. A lot of people talk about, "Oh well. It's sugar that's causing heart attacks, or it's obesity, or it's saturated fat or whatever." But [] the only curves that match perfectly, up and then down again, [are the per capita rates of cigarette smoking and per capita rates of heart attack deaths] because deaths per capita from heart attacks have fallen, as has the per capita cigarette smoking rates. They're almost perfect mirror images of each other. In my view, cigarette smoking is relevant to this whole conversation about vegetable oils, because cigarette smoke is bad for us for the same reason that vegetables oils are bad for us. That has to do with oxidation.

Oxidative stress is what happens when your body has all these free radicals that are deteriorating in your body. Oxidative stress is like the great disease maker. Every chronic disease, we now know, is associated with oxidative stress. There's not a disease you can name that isn't. Whether it's

cancer or the A to Z of diseases – Alzheimer’s, cancer, even diabetic complications and infections – are worse. When there’s a lot of oxidative stress, your immune system doesn’t work as well.

**JM:** Ultimately, that stress has this impact on the mitochondria, which is why it produces these symptoms. Most of the oxidative stress actually occurs in the mitochondria, in the production of energy, but it’s key. The mitochondria, of course, have cell membranes. They’re made up of? Fat.

**CS:** Right.

**JM:** Imagine that. Especially in the brain – you do a wonderful job of exploring the relationship of this damaged fat into the brain and all the toxic consequences. Why don’t you delve into that?

**CS:** Yeah. Our brain is made out of about 50 percent fat by dry weight, and about 30 percent of that are the two types of essential fatty acids, both the omega-3 and the omega-6.

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We talk a lot about how you need omega-3 for your brain, as if omega-6 is not part of the equation. But it’s an equal part of the equation. These are very, very fluid molecules. That’s why they’re in oils and not [as much] in solid fats like butter. Our brains are all about fluidity, that’s how they connect. Our nerve cells speak to each other because the membranes are so fluid in our brains that they can bleb apart and deliver the signal of one nerve cell talking to another nerve cell in the blink of an eye, the speed of thought literally. That’s why we need these special fatty acids.

But the thing that makes our brain susceptible to aging and age-related diseases is the fact that we have these highly reactive, easily oxidized fatty acids in our brains at high quantity. If our diets are not high enough in antioxidants and the vegetable oils are completely stripped of antioxidants and the way they affect our liver, they strip out the glutathione, which produces the antioxidant enzymes.

Aside from the antioxidants we can eat, we have enzyme systems that are antioxidants. Eating vegetable oils kind of outstrips the ability of these enzymes to control oxidation. We need more antioxidants in our diet. They do help. But really, if you stop eating vegetable oils, you hardly need to eat the same amount of antioxidants. You don’t need to supplement so much. But you do, definitely, always benefit from having antioxidants in your diet, particularly if you’re healing from a standard American diet. One of the big ways that it damages you is by this process of oxidation.

The first step I always tell people is getting these vegetable oils out of your life and out of your head.

**JM:** This is where they wind up if you’re eating them.

**CS:** This is where they wind up. That’s right.

**JM:** The key thing – maybe you can expand on this – is avoiding processed food, eating real food. That means you cook most of your meals at home. You stay away from restaurants because there are hardly any restaurants around, way less than 5 percent, that are going to prepare you truly

authentically healthy meals prepared from real food. It's not that you can't do it. They're really hard to find. Why don't you expand on that, because that's the core of what we're teaching?

**CS:** How we do it.

**JM:** How do you do it? How do you make that transition? How do you avoid all these pernicious toxicities?

**CS:** The first step I recommend to my patients and what I talk about as the first step in the book is really to start with a healthy breakfast, because breakfast is the most important meal of the day not to screw up. If you don't want to stop and turn 180 degrees and suddenly become a gourmet chef, just start with a healthy breakfast. Have good quality pastured milk if you can get it, or at least organic, with cream in your coffee. Very simple. That's going to help you burn fat, right? No carbs, but plenty of healthy natural fat. You could also have eggs with cheese, butter and maybe whatever vegetables you like for flavor, not the starchy vegetables obviously. Those are two examples of just a really healthy breakfast.

Once you do that, once you get your day started where you're helping your fat burn, that you have revved up overnight when you weren't eating – I talk about time between meals as like the fourth macronutrient, right? You're eating your body fat at night, hopefully more and more as the night goes. You've got the fat-burning enzymes ramped up. If you have a very high-fat breakfast, you keep that rolling, and then you don't have that hunger drive anywhere near as strong by lunch. You don't have to snack. You can make a better choice, maybe. You can, at the very least, concentrate better and don't have to have another bit of sugar to concentrate well at work. That's kind of like the first step that I recommend a lot of people take.

**JM:** I will challenge you on something because if you were to take your circumstances back 16 years ago now, when you were suffering out in Hawaii with your chronic fatigue syndrome from eating all the sugar as a runner, it's my belief and understanding that if you were to have even raw milk in your coffee, that may not be the best option because there's still sugar in that. It's galactose. It might be a better option to just throw the butter in, which has low carbohydrates, which might give you a better chance of doing that, because you really have to make this. At least in the transition phase where you're converting to or teaching your body how to burn fat as its primary fuel.

**CS:** Yeah. It kind of depends if you were a dairy eater. Because if you were, you probably have a lot of lactose-fermenting bacteria in your gut anyway. People with healthy gut flora – I'm not citing any research. I'm just saying I would imagine that people with healthy gut flora can have less of a glycemic response, because of those bacteria gobbling up that lactose and galactose.

**JM:** Yeah. That's a perspective. I'm not sure if it's going to be –

**CS:** I don't know if it's bad.

**JM:** Yeah. They'd have to make it to the large intestine. My guess is that it's going to be broken into disaccharides and the monos long before it gets there. It gives the bacteria the opportunity to

digest it. It's going to be absorbed systemically into the blood, where it's going to continue the same process. But the short-chain fatty acids don't get digested. They go and they fuel those bacteria, like the propionic acid, the acetates and butyric. Those are really useful for improving the microbiome.

**CS:** Right. Yeah. One of the things that I'm a little bit fuzzy on, and I think a lot of people are, is what's going on in the small intestine? Because we know that we eat bacteria and they end up in the colon. We can reach the colon and study it. But I'm not clear that the small intestine is as sterile as we were taught that it was in medical school, because we eat bacteria. When do they wake up again? We do produce mucus in the small intestines. Maybe they are alive in there. It's a very difficult place to study because we just can't reach it with scopes and things. But maybe you know more about that than I do.

**JM:** No, no. I think it's still a mystery. I don't think anyone realizes what's going on down there. We probably don't know and we'll learn more as we go on. I actually hadn't heard until I heard your Ben Greenfield interview that there's a toxin that's in fat, which is called 4HNE, which is really quite significant. I'd like you to expand on that because it's another important piece of information that if you have will help you avoid these toxins.

**CS:** Yeah. 4HNE, shorthand for 4-hydroxynonenal – if anyone wants to google that. It is formed during the process of processing the vegetable oils into polyunsaturated fats. It's highly toxic. It actually is toxic to gut flora, to the good gut flora as well. Its consumption is correlated with having a much more obesogenic balance of gut flora.

They've actually done studies where they create fat mice and then take that gut flora from the fat mice and give it to skinny mice. It changes the way the mice behave. They get more anxious. Some of the mice will actually eat more. When I looked at this study, I said, "Well, how did they make these mice fat?" What they were doing was feeding them a high-fat diet.

Here's where it gets really complicated. There's a gentleman that you need to have on your show, because he is like one of the 10 top few people in the world who know what I'm about to tell you. That is that most of the studies on high-fat diets that use lard are using lard that came from animals that were fed corn and soy and as high in polyunsaturated fatty acids, nearly, as if they were fed corn and soy oil. These so-called high saturated fat diets are far from it. That means that we have to rewind hundreds of millions of dollars worth of research into the so-called health harms of high saturated fat diets that were done in animal studies.

Getting back to the study that we were originally talking about, the way they made the mice fat was with this lard that was very high [in PUFAs]. The research diets came out with a small press release that didn't get any attention. [They] said, "You know what? We just found out that the fatty acid profiles that we've been telling you, they're totally wrong. Oops. They've probably been that way for maybe a long time. Anyhow, keep buying our stuff." It's really kind of mind-blowing, the consequences of that. The fact that there are well-meaning doctors and researchers out there who don't understand the science at the depth that they need to recognize that they're being misled.

**JM:** The consequence of that, of having all these omega-6 vegetable oils and what's ostensibly is a saturated fat diet, is that it gets metabolized to 4HNE, which causes this DNA damage and the pathology that they're actually observing in these studies. Is that the mechanism?

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**CS:** Yes. It causes cytotoxicity and DNA damage. They're just very bad. They are instigators of free radical cascades, which damage the cell membrane, damage the mitochondrial membrane. The free radicals themselves, if they're occurring inside the nucleus, they'll damage DNA. Of course, they'll damage mitochondrial DNA. It's just like cell Blasto.

You can't almost design a better delivery vehicle for a toxin that's going to destroy your health slowly over the course of maybe 10 years, maybe 20 years, depending on the genetics of your antioxidant system capacity. This is where we get the individual differences from who is better genetically able to handle oxidative stress, to handle the side effects of the modern diet, which is really an all-you-can-eat buffet of variety, an endless variety, of chronic disease.

**JM:** One item we didn't touch on is that many of these – you do in your book, but I just want to emphasize here – vegetable oils are genetically modified organisms (GMO). As a result of that, they're not only genetically engineered, but they're designed to resist herbicides like glyphosate. They're contaminated with glyphosate, which disrupts your gut tight junctions and increases penetration of these foreign invaders, especially heated proteins, which can cause allergies. It just goes on and on. It's just a synergistic toxicity.

**CS:** Absolutely. I don't normally bring up this fine point when I'm being interviewed, but as you're a doctor, I will. The percentage of toxin in vegetable oil, even if it's GMO-free – The difference between GMO-free vegetable oil and organic vegetable oil, with regard to toxins, is going to be maybe like 10,000<sup>th</sup> of a percent fewer.

**JM:** This is not just glyphosate. This is the 4HNE.

**CS:** Yeah. The 4HNE comes from the oil itself.

**JM:** It's intrinsic. It's a physical phenomenon that occurs when you refine and process oils, no matter how healthy it is initially.

**CS:** It's made out of the oil. Right.

**JM:** Right.

**CS:** Let's say you have a bottle that's like, I don't know, a liter – whatever that is in English.

**JM:** A quart.

**CS:** Thank you. As much as 5 percent of that can be toxic types of trans fat. That is 50 grams. That's like almost 2 ounces. We're talking about 2 ounces of a highly toxic compound versus parts per million, which you can't even measure [in your kitchen]. You can't feel it. The glyphosate is

bad. I'm not a fan. It's really bad for the environment. Its effects on us are intermingled with the fact that what it's in is these toxic vegetable oils. We don't really know how bad it is.

**JM:** We do. There's a lot of science supporting how toxic it is.

**CS:** Of course, of course.

**JM:** It's synergistic. It's not like one or the other. You want to avoid them both. Eat real food. It's a simple strategy. It's not complicated. It's not hard. Just stay away from restaurants. Know who's making the food in your house, whether it's you or someone you delegate it to. It's a key thing.

But I want to go back to some of the details of the fat, because that's the key. My understanding is the single most important fat you can have is docohexaenoic acid (DHA). It's critical. It's absolutely essential. It's really the only fatty acid that I know that you eat. It lets you starve. Your body is not going to burn it for fuel. It's going to integrate it into your cellular membrane. It's essential, especially for the photoelectric event for converting photons from the sun into direct current (DC) electric current to energize your mitochondria.

The key is how do you get it? I believe – and I think you do too – is that you get it from real food. We know seafood's contaminated, unless it's really tiny ones like sardines and anchovies, which I don't think you disagree with. But there's some confusion in your book and I just want to go over that.

My review of the literature is that, yes, there are other omega-3s, the alpha-linoleic acids (ALAs) from the plant base, like flax, chia and hemp, that do convert to some DHA, but my understanding is that it's clinically insignificant. It's less than 5 percent and less than 1 percent, which is not going to replace the DHA you need in your brain. I'm wondering – unless you're aware of other literature that I'm still behind on reading.

**CS:** Yes. There are researchers that have done work showing what happens to omega-3 levels when you just pull back on the omega-6 in your diet, basically, and the DHA. It turns out that just pulling back on the omega-6 enables your liver to function better so that it can actually elongate those short-chain omega-3s much more efficiently. It has to do with the enzymes called delta-6.

**JM:** Delta-6 desaturase.

**CS:** Yeah. That's inhibited by some of these toxins that are the breakdown products of the vegetable oils.

**JM:** High insulin levels will also inhibit that enzyme.

**CS:** Yes.

**JM:** Maybe the studies I'm reviewing are related to the people who are eating lots of omega-6 vegetable oils and have insulin resistance. It's like impossible. There's no way they're going to create more. But if you have a healthy person, it's a different scenario.

**CS:** Yeah. You know what, when people are insulin resistant, we don't know that they are – Like the cause there, it could actually be related to the fact that they've got vegetable oils in their liver, damaging their liver's ability to respond to insulin normally.

The reason I said this is because Francis Sladek, who is at the University of California, Riverside, did some research comparing coconut oil versus corn oil. She found that [with] equal amounts of carb in the diet, the corn oil led to [greater] insulin resistance, glucose intolerance and what you would call prediabetes, as well as obesity [compared to coconut oil].

Our mechanism of understanding the true molecular underlying pathology here of obesity, diabetes and so on has importantly focused on sugar, but myopically focused on sugar. We've not looked at the other major factor in our diet, the fact that we're eating these vegetable oils and 30 to 50 percent of our calories. We've always consumed carbohydrate. We've always consumed sugar, certainly not quite as much and that's something you can argue about, the quantities and stuff. But we've never consumed 4-hydroxynonenal and all that kind of stuff that we are now consuming.

**JM:** I couldn't agree with you more. Thank you for saying it so eloquently and precisely. It's really well done.

**CS:** Thanks!

**JM:** You've capsulized that information so well. But assuming that that's true – I believe it is, as you do – that you would extend that analysis to other types of processed vegetable oils. When I lecture, I frequently ask the audience, "Who here has flaxseed oil in their home?" I say, "Just think of the neighbor or relative you don't like and just give it to them, because it's oxidized. You've got to get rid of it."

Here we talk about avocado oil. Olive oil is different. It's not a processed oil. It's actually squeezed. It's pressed so it's a little bit different. But there's the whole other issue of if it's adulterated or not, which is like 80 percent of the olive oil in the U.S. But I'm wondering if you could comment on just getting rid of all the darn oils, you know? Coconut oil and olive oil might be exceptions, but if you want avocado oil, use avocados. If you want flaxseed oil, use flax seeds. If you want sesame seed oil, use sesame seeds.

**CS:** This is why when people go on the Esselstyn or the Ornish diet and avoid all added oils, they do experience benefits.

**JM:** Brilliant. I wanted to explain it before, but that makes sense. Yes.

**CS:** Yeah.

**JM:** It makes perfect sense. It's just getting the toxic oils out of their diet.

**CS:** Yeah. Exactly. That's a big factor, right? Even if they may not be having what I would consider a perfectly balanced diet, at least it's a huge step in the right direction. I can't completely say that that is an unhealthy diet. No.

I do have on my website, I finally posted after years of people saying, "You need to have a list of good fats and bad." It's on my website now. You can print it out too. It's like a little infographic on good oils, bad oils and okay oils. Okay is like – If you can't afford as much of the good ones as you'd like and you don't want to give up oil altogether because you just love your fried chicken or whatever, just realize that this is better than Crisco and all those other vegetable oils, like corn and so on.

**JM:** If you give us permission, we'll be glad to incorporate it in the article of this interview, because I think it sounds like a really useful tool.

**CS:** Of course. Absolutely. Thank you.

**JM:** The more information we get out to people, the better, to help them understand and apply this process. You would definitely agree to just stay away from all the processed oils no matter how healthy it tends to appear, no matter if it's organic. Just get it from that original source. Do not refine it.

**CS:** Yeah. If you can do that, that's great. One of the best fats is not even an oil. It's butter. I use that a lot. Also if you want to deep fry and you can get your hands on some tallow or beef, that's an extremely delicious culinary –

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**JM:** Treat.

**CS:** Yeah. Exactly. It's a little more expensive if you're getting the grass fed stuff.

**JM:** Let's talk about that. Because if you were to extend this thinking forward, you might be concerned about some toxic metabolites even in tallow, even from healthy grass fed tallow, that may not be optimal for health. I'd like to hear your view on that and what your perspective is.

**CS:** Yeah. Let's say you get lard from a pig that was just conventionally raised and they've gotten lots of soy, corn, and even added cottonseed oil in the feed because they just want to bump up the calories and get those pigs fatter, which works really well. It gets us fatter too. Let's say you're just getting regular lard, how does that compare to vegetable oil? It's better, but it's not really something I could really recommend.

The reason I say this is because I've been eating grass fed and avoiding these oils for over 10 years. Recently, I've been having more non-grass fed beef with the fat on there. It gives me a stomachache in the exact same way that I get a stomachache when I have any of these oils.

Our intestinal tract is the first line of defense against this stuff. If you haven't had it in a long time, the enzymes that I mentioned, those antioxidant enzymes are relatively downregulated because

you haven't built up the need for them. You don't have the need for them. You have more sensitivity to it. I'm extremely sensitive now. I just had like a steak and I got a stomachache. That was very depressing. But to realize that, that means that those cows were not well-fed.

**JM:** To me, that's a classic example of being grateful for those types of symptoms because your body is the best biological indicator. You just have to learn to develop the sensitivity and appreciation for it, and know that something you ate is bad. How else is it going to communicate with you that you're doing something that's not good for your long-term health?

**CS:** Exactly. Exactly. People do say, "If this stuff is so bad, why don't I feel bad?" If you have heartburn or if you're on heartburn meds or if you have any kind of intestinal problem, you're feeling it.

**JM:** Yeah. Most of the time it's the food that's caused us to go on these prescription drugs, which in no way, shape or form treat the foundational cause and just are symptomatic Band-Aids that ultimately cause more harm than good in almost every single case.

Before we hit the record button on this interview, I asked you about mechanistic target of rapamycin (mTOR) because I have so many professional alliances I speak to that just have no clue what it is. It's really one of the most important, probably the most important metabolic pathway in the body. That stands for rapamycin, same as the cancer drug, very potent. It suppresses this pathway because when this pathway is elevated, it's just like elevated insulin that causes damage and problems. The biggest catalyst to increase mTOR is protein.

Generally, it doesn't mean that you have to suppress it all the time, just like you don't want to do ketogenesis all the time. You just want to do it long enough until you transition, and then cycle it in and out, because that's healthy. Cycling is healthy. Similarly, I think you have to cycle with mTOR.

I'm a little bit concerned. One of my mentors is Ron Rosedale and he taught me this. I dove deep in the molecular biological literature and I couldn't find anything to dispute it. But I'm not sure in your perspective in that he says you should be a gram per kilogram of lean body mass, which for most people is 30, 40, 50 or 60 grams of protein a day. In your book, you recommend 4, 6 or 8 ounces of a meat source of protein, which would far exceed that. It's like a protein amount in one serving. I'm wondering if you could comment on that.

**CS:** Yeah. What I recommend for women is somewhere around 50 to 60 grams, and maybe a little bit more for men. If you're just going to get protein only from a steak that would be like a 10-ounce steak, if you had no other protein sources. It's a good amount. I recommend that a lot of the time, but not all the time. I do recommend, like you were saying, cyclic intermittent fasting.

The way I kind of look at it is, what is mTOR? What is it for? What does the cell think about mTOR? What is its purpose in the cell? Of course, it's slightly different in different cell types. In general, it's a decision point for the cell as to whether it's going to hypertrophy or grow bigger, which is what athletes want.

When you're talking to the sports medicine people, they're like, "mTOR! Yeah!" When you're talking to the cancer people, they're down on mTOR, because mTOR makes cells grow and divide, and cancer is a disease of uncontrolled cell division. Like you said, it's kind of like, "Well, what's better? Day or night?" You need both, right? You need protein. You need to have high amounts at some times, so that you can get the signal to your muscle to grow and to keep on growing. [It's] especially important if you don't exercise a lot, because your muscles, especially after age 35, atrophy much more quickly when you don't exercise.

If you're at that age or above, you need to, a lot of the time, get signaling with a total of maybe 50 or 60, for a woman, grams of protein every day, and maybe 10 to 20 grams more for men, to signal that mTOR so that those muscles don't atrophy. On the other hand, every once in a while, you kind of need to do a little housekeeping and cleaning and getting rid of the cells that your body is not really using. That's where intermittent fasting and ketosis come in. There's a balance.

**JM:** Yeah. I think that there's still benefit to keeping the protein intake a little bit lower and just having the higher doses infrequently, the days that you're actually engaging your anabolic processes with strength training or some other form where you're going to actually use those protein sources in the signals, the insulin-like growth factor 1 (IGF-1) and the increased insulin levels are sure going to do it, which I think are important.

You had mentioned that the cancer go down on mTOR, but Dr. Thomas Seyfried, as I'm sure you're aware of, is one of the primary researchers here. There's a group of oncologists in Turkey. I interviewed Dr. Abdul Kadir Slocum. He's one of the ones who speak English well. They unknowingly – they didn't do it intentionally, but they were implementing this feast and famine strategy. They were giving them large amounts of food after their chemo. It actually worked. They didn't do it intentionally. It was an after-effect of their protocol.

**CS:** Wow.

**JM:** It actually improved. Even in cancer, you still need to stimulate mTOR occasionally.

**CS:** It makes the chemo look good, right?

**JM:** Yeah.

**CS:** It's really the fasting and the refeeding.

**JM:** Yeah. It's the refeeding. I think the metabolic magic actually occurs during the refeeding, but you've got to go through the process initially. It's like the metabolic magic of exercise occurs during the rest period. But if you never did the exercise, you're just going to rest, you're not going to get the benefit.

**CS:** This is why I like the ancestral way of thinking, right? We evolved, for most of our history, as hunters, gatherers and intermittent eaters. We didn't necessarily eat every day because we didn't bother hunting every day. Some days, we would overeat because we had to finish off this giant thing we just caught. It just mimics what, as omnivores/carnivores, we've been doing. You have

to do it artificially now. You have to think about it, sort of, if you wanted to. Or you could just do what a lot of people kind of fall into, which is when they're traveling and it's not easy to get healthy food, well, you just don't eat maybe for a while.

**JM:** I call it the RAP principle, replicate ancestral practices.

**CS:** That's good.

**JM:** Because our biochemistry and our genetics were all optimized for this. You can go back 10,000 or 100,000 years, however long you want to trace it back. mTOR is like of the most highly conserved biochemical pathways in the whole animal kingdom. It's just like in almost every eukaryotic cell.

**CS:** Yeah.

**JM:** We violate these things. The biology doesn't care who we are and how much money we have. If you don't honor these ancient signaling pathways, it's going to devastate your health. There's just no way out of it.

**CS:** Absolutely. That's the patterns, the habit, the environment, and your habitat that used to be following the natural cycles. But now, it doesn't at all. That's part of why it's kind of hard for a lot of people to understand what to do and how to adopt all of it. It seems like so much at once, because really, it can be overwhelming. That's why I kind of helped people to pick where do you want to start. Do you want to start by maybe just narrowing your window of eating so you only eat maybe eight hours a day? Or do you want to start your day with a healthy breakfast? Or just not snack or something?

There are very simple changes that as long as you feel some positive feedback, that you get more of that mental clarity, you can continue to make the next change.

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**JM:** Yes. You do a really great job in your book. It's a pretty long book.

**CS:** I know.

**JM:** It's 600 or 700 pages. But it's great. You don't have to read the whole thing. You can read what you want.

**CS:** That's nice.

**JM:** But it's a useful tool. You obviously were OCD, obsessive compulsive, in putting this stuff together. That's great. You need people like you. What's your next book going to be on?

**CS:** Yeah. I'm going to do something as more of a programmatic book of how to adopt this way of eating. Focusing also on fat burn, because I think it's so important to help people understand the benefits of being a fat burner, right?

**JM:** Yeah.

**CS:** They're unending, because it's our natural state.

**JM:** I'll encourage you to consider some other options too, because what I did in my book is help people understand that – It is about fat burning, and that helps optimize your mitochondrial function. But there are other things, other than the fuel that you're consuming as food, that can also optimize mitochondrial function. Like cold thermogenesis and jumping in the cold pool, which increases brown or beige adipose tissue, and optimizing photobiology and minimizing exposure to electromagnetic interference. A lot of different things. You can exercise. I can go on and on but it's just a whole ball of wax.

But probably one of the, maybe the most important – although some people may challenge that with some of these other things as equally important – would be the fuel you eat. It's a simple thing. You've got to eat. You've got to eat, you might as well do it right.

**CS:** Exactly. Yes. I'll refer people to you for the biohacking and stuff like that.

**JM:** I'll get you a copy of my book so you can use it for useful strategies in your new book, because we all need to share this information. The more people that are sharing it, the better, because the media isn't going to tell you. It's controlled by six corporate sponsors, six corporations that really follow through almost everything you're going to hear. We need these other resources that will tell people the truth about what they need to eat to optimize their health and avoid these chronic degenerative diseases that are barraging us.

**CS:** Yes. I think the next generation of doctors is much more aware of all this. I'm working, actually, with medical students so I'm hoping to help increase the proportion.

**JM:** Bless you for doing that. There's certainly a need for that. That's great. That is just honestly great.

**CS:** Yes.

**JM:** You're playing a very valuable role. I'm really grateful for all that you're doing. I really appreciate it.

**CS:** Well, thanks for doing what you're doing, getting the word out so effectively.

**JM:** Yeah. We're just communicating and we try to do that. Before we close, are there any points you'd like to emphasize or maybe points we didn't discuss during our conversation?

**CS:** Yeah. I think the main thing is that we can make it all sound complicated. My husband always likes to actually remind me that food should taste good, and so you should enjoy what you're eating. You will enjoy what you're eating when you get these vegetable oils and too much sugar out of your diet. You will enjoy the healthy food a lot, lot more. You'll really appreciate it.

**JM:** Yeah. Your memory comes back. Your mental clarity improves. Your cravings just disappear once your body burns fat for fuel. I mean it's the most magical thing. I mean I knew about how to eat healthy for a long, long time, many decades, but until I really taught my body to burn fat for fuel, those cravings just never [leave]. I could have controlled it because I've got good willpower, but you don't have to. You don't have to.

**CS:** Exactly.

**JM:** It's just great. Thanks for everything you're doing. We'll look forward to your next book. We'll have you on when it's written, probably four years from now.

**CS:** Yeah. I've got a year, at least.

**JM:** Good. We'll definitely have you on for that. We'll coordinate it so that we can get you some attention on the New York Times list. It'll be good.

**CS:** Awesome. That would be fantastic. Thank you, Dr. Mercola.

**JM:** Alright. We'll look forward to the next time.

**CS:** This has been a pleasure.

*[END]*