

Dave Asprey:

If you haven't heard about the benefits of camel milk, it's totally worth your time to look into this as something you could add to your Bulletproof diet. Camel milk is something that I learned about from Walid, the owner of Desert Farms, who's the largest seller of camel milk out there. Camel milk got its start in the autism community because it's non-reactive, the way cow milk is, and now it's just become one of the new super foods that's out there. One of the reasons is that it's full of lactoferrin, which is a natural substance that's present in mother's milk that has antibacterial, antiviral, antiparasitic, anticancer properties, and it doesn't have lactose or lactoglobulin, the stuff that makes lactose-intolerant people unable to process milk from cows.

Desert Farms' camel milk is also organic. It's tested for heavy metals and actually 900 different contaminants. It is keto certified, GMO free, has no bovine growth hormone or anything weird like that, and it's pasture raised so it's all grass fed. Desert Farms is offering a really good deal for Bulletproof listeners because they were at the Bulletproof conference, and we got to be friends. They're giving away a free bottle of camel milk for you. All you have to do is pay for shipping and handling. Just head over to DesertFarms.com/Bulletproof to get your free bottle of camel milk right now. That's DesertFarms.com/Bulletproof.

Speaker 2:

Bulletproof Radio, a state of high performance.

Dave Asprey:

You're listening to Dave Asprey with Bulletproof Radio. If you're a regular listener, you've heard me share my list of top 10 biohacks. Let's talk about number nine, fun hacks for the Bulletproof mind. It may sound weird, but hanging upside down is a great way to hack your brain. Regularly inverting trains your brain capillaries, making them stronger and more capable to bring oxygen to your brain. It's pretty straightforward. More oxygen in the brain means better performance.

I get my daily stretch and my dose of oxygen with my Teeter inversion table, which is so essential for optimum focus, concentration, and mental energy. That full-body stretch elongates the spine and takes the pressure off the discs so they can plump back up. Less pressure means less pain. If you have back pain, even if you've been lucky enough to avoid it so far, you really want a Teeter to invert every day to keep your back and joints feeling great.

For over 35 years, Teeter has set the standard for quality inversion equipment you can trust. My friends over at Teeter have decided to show some love to Bulletproof listeners. For a limited time, you can get the Teeter inversion table with bonus accessories and a free pair of gravity boots so you can invert at home or take the boots with you to the gym. To get this deal, which is a savings of over 138 bucks, go to GetTeeter.com/Bulletproof. You'll also get free shipping and a 60-day money-back guarantee and free returns, so there's absolutely no risk for you to try it out. Remember, you can only get the Teeter with bonus accessories and a free pair of gravity boots by going to GetTeeter.com/Bulletproof, G-E-T-T-E-E-T-E-R.com/Bulletproof. Check it out.

Today's cool fact of the day is that there's a reason that you sneeze when you go outside into bright sunlight sometimes, and it's probably not what you think. It's because we're hardwired at a very low level so that when we're exposed to really bright light we do that to clear out passages, because the first time you're ever exposed to really bright light is right after you're born, when you're full of, well, mucus. The reflex is to sneeze to clear your breathing passages, and we carry that with us throughout life. When you go from that dim conference room into that bright sunlight to get the healthy amounts of ultraviolet light that our bodies need from natural sunlight, if you sneeze, it's okay. Just celebrate and thank your mom.

Dr. Cate S.: Cool.

Dave Asprey: You know how important it is to eat meat that's 100% natural, meaning it hasn't been injected with hormones and that the cows were fed high-quality sources of food. Not everyone has the access or time to hunt around for high-quality grass-fed meat. That's where ButcherBox comes in. They deliver healthy, 100% grass-fed beef, organic chicken and pork directly to your door, and their products are humanely raised and free of antibiotics and hormones. Each box comes with seven to 10 pounds of meat, which is enough for 20 individual-size meals. You can choose from four different box types: all beef, beef and chicken, beef and pork, or the mixed box. That's enough food to last you almost a whole month. You can also customize your box with add-on items like bacon, rib eye, and beef bones.

Each box also includes step-by-step recipe cards and a note from the butcher describing the cuts and farms featured that month. Plus, they deliver for free nationwide, except for Alaska and Hawaii. The price is just \$129 a month, which works out to less than \$6.50 a meal. At that price, it's a steal. Order now and get free 100% grass-fed burgers. That's six 6-ounce burgers for free in your first box, and use code Bulletproof to get an additional \$10 off. Get started by visiting ButcherBox.com/Bulletproof. You can cancel anytime without penalty, so give it a try. Head on over to ButcherBox.com/Bulletproof right now and get your free 100% grass-fed burgers and \$10 off with this code, Bulletproof.

Today's guest is a really powerful researcher and influential voice in the world of high-fat nutrition and someone who has worked extensively with the L.A. Lakers to the extent that Kobe Bryant says that he trusts her implicitly, and he's seen great results when he started doing her program last year. That's pretty cool stuff, but that's one thing. The most important thing behind that is that today's guest, who is Dr. Cate Shanahan by the way, is a board certified family physician who also trained in biochemistry and genetics at Cornell, and then attended Robert Wood Johnson Medical School, went on to study ethnobotany in Hawaii and looking at culinary habits of her healthiest patients.

She's written a book called Deep Nutrition, which is really worth your time to read. It's in the quadrant of the nutritional map where you'll find things like

Weston A. Price like Paleo, Primal, Bulletproof, Whole30, all of those sorts of things where we're like, "Eat lots of real food," and there's variations between each of those things, and some of them came from ancestral stuff, some didn't. Bulletproof is biochemistry derived, not derived, but we all end up in the same part of the map. Whether or not we're in different neighborhoods is a different thing, but none of us ended up at the low-fat thing.

That's Dr. Cate's bias that, she'll tell you it well, "After many years and all this studying that goes beyond normal medical school, here's what I found, and here's what works for these really tall guys who run around and kick everyone's ass." Hey, let's do that. Dr. Cate, welcome to the show.

Dr. Cate S.: Thanks. I am so delighted to be here. Thank you so much for having me on again.

Dave Asprey: Now, I first heard about you a few years ago, because I saw this article, I think it was in the L.A. Times, that said, "The L.A. Lakers are drinking Bulletproof coffee," and I'm like, "Wow. This is really cool." We've had a chance to email back and forth and chat a couple times, and you really did change a lot of what America was willing to pay attention to, because when a whole team is getting really good results and they're eating not McDonald's and Gatorade and stuff like that and switching to, "We eat real good and tons of vegetables," and you see these sports heroes do that, it really makes it a safe or a manly thing to do, or at least a sane thing to do, for most of the country. Thank you for just getting it out there in that way.

Dr. Cate S.: Oh, yeah. We did it because we wanted to promote ... Well, obviously, we wanted to help the Lakers, of course, and our big pitch was that it would help recovery from injury. It also gives them more energy, which they really appreciate, but we gave a fuddy-duddy pitch. It wasn't like, "This is the latest, greatest new thing." It was like, "This is just what everyone used to do, and we've come so far from that." We scientifically analyzed why it would be good to get back to that, and what exactly that was that we used to do.

I think it was it's hard to overstate just how cautious these billion-dollar franchise are with what they do with their diet. They literally hadn't changed anything in over, roughly, 30 years just because there was no obviously compelling reason for the head trainer to change away from what was, really, the standard American approach at that point in time, because he had not really encountered enough science to say, "Okay. Well, I know there's this massive wall, and ivory tower's full of evidence that you should do low fat, and sugar's the perfect fuel for athletes," but there hadn't just been anything really that had convinced him that there was another way to do things that might be better.

Gary Vitti, who was the head trainer at the time, was our connection that got us in there, and he's a foodie. It really made a lot of sense to him when we said that chefs are the original nutritionists, because he had always had the personal

experience of just thinking about getting the freshest food from the best source and cooking it simply to bring out the flavor. Then he was happy to hear that it also enhances the nutrition. That's the approach that we take to try to just make it clear that a healthy diet is also a delicious diet.

Dave Asprey:

There's been this weird division in cooking and food. We have things like molecular gastronomy, that the former and original CTO of Microsoft is one of the pioneers of, where you use these advanced molecular biology and biochemistry techniques to make food that's ... and interesting new things, and the most famous recipe that came out of that school of thinking is probably french fries that are perfect. They're only cooked four times, always in bad oils, but they taste amazing.

When your view of the world is, "How's it going to taste?" you end up making Pop-Tarts and all sorts of weird stuff that aren't really biologically compatible, but when your perspective is, "How are you going to feel after you eat this?" and then, "How do I make it taste good?" it's a different kind of taste. It's like a food high that comes from it, and I think many people have never experienced food that's so fresh and so clean and so good and so well-composed that when they eat it, they're like, "I don't know why I have all this energy, but I have to do something good."

Dr. Cate S.:

Exactly. I think you're totally right because you don't really know ... I like to tell people that you don't really even know who you are until you get your brain more used to burning fat, and also where it's ... It has to really be rebuilt, because if you've been following a standard American diet, the fats that you had been eating are what your brain is made out of, and those are all very prone to oxidation, and the function is not going to be where it needs to be. It takes a couple of months, in most cases six months, before we really realize, "Wow. I feel like it's been a long time since I've been really hungry. It's been a long time since I've had brain fog. I feel like my brain is on now."

Dave Asprey:

Yeah.

Dr. Cate S.:

All day.

Dave Asprey:

In my mind somewhere, I have a reference that says, "It takes 900 days to replace 75% of the cell membranes in your body." These are cell membranes made out of fat. If someone goes on your program, someone just starts adding egg yolks and butter and grass-fed animal fats to their diet, it can take a couple years before, really, they get functional membranes. How important are the outer cell membrane and the mitochondrial membrane? Can you talk about that from a biochemistry perspective for listeners?

Dr. Cate S.:

There's nothing more important than what your body is made out of, and one of the reasons that natural fats are so important, particularly for brain function, is that your brain is made out of 50% fat by dry weight, and if those are fats are

not natural ... and I should define what I mean by unnatural fats, but if they're not natural, your body still has to use them to do its very best to build a brain. It's like you are at a construction site with your contractor, and the contractor's like, "Well, I know you wanted your house made out of bricks, but those never showed up. We did get these styrofoam balls. We've got to get this show on the road here, so let's just go for it, see what happens." The body does its very best with the equipment that it has on hand, but it's not going to perform at its very best.

Actually, there's probably a movie that's coming out maybe in the next few months. The title is in flux, so I can't tell you the title right yet, but there's a scene in there that is so moving. They have a family that has an autistic child who's five years old, and at the start of the movie, she's non-verbal. She doesn't use utensils to eat with, and in two weeks of getting these nasty fats out of her diet and getting real foods in her diet, she starts using language. She starts saying, "No," when she doesn't want something, and she starts using a fork. By five weeks, she's suddenly acting like a normal-ish child.

Now, unfortunately, she's acting almost like a normal two-year-old child because her brain development was so delayed, but at least we're getting to the point where you can make that human connection. It's just such a moving thing, because the transformation is really amazing, and it just takes five weeks just to get started. It may take a full two years, three years. Children are growing, so it would probably be a lot faster, but it's just so great to be able to get some of that positive feedback right away, because it is very hard to change a child's eating habits. It's hard enough to change your own, but to change a child's, you have temper tantrums, and you have to be firm.

This man was up to the task. It was the father who was in the movie. Then they show him that ... For five days, she just basically didn't eat, and it was torture for him, but eventually she gave in. It's like something snapped, and she just started eating, and it was good.

Dave Asprey: The fasting might even have been a good thing to do.

Dr. Cate S.: Totally good point. I hadn't thought of that.

Dave Asprey: My kids, they're seven and nine now, but they eat Bulletproof, and they like it. They don't hold resentment about it, but both of them at least one time have said, "I'm not going to eat that," and it's like, "Oh, okay. You want to try fasting? Awesome. We can go 30 days without food, so we'll just put that food away right now, and you'll be totally fine. We don't have snacks when we're fasting," and then their eyes get really big and they're like, "30 days? Give me the food." There's never a problem.

Dr. Cate S.: That's a great tactic. You ought to do a little biohacking family life.

Dave Asprey: I think there's a post about it. There's a post that's called Eat Your Damn Broccoli. I think that's what the post is called, and it's like hunger and gravity are really good teachers for kids. If you do that, you'll fall. As long as they're not going to hit their head and get a TBI, traumatic brain injury, then they're like, "Okay." You were warned, and after a little while, they're like, "I think I'll start paying attention here." Either that or they don't fall, and they feel good about it, so who knows?

Dr. Cate S.: You're so right. Hunger is a great teacher for us and for children, too, because hunger puts you much more in tune with your natural appetites, and it does reset a lot of these appetite-regulating hormones that, if you're eating all the time, especially ... and this culture is amazing. People feel like it's dangerous to be hungry or that if you eat more frequently it'll speed up your metabolism or that if you are hungry, it's a sign of a fast metabolism. All of those things are not correct.

Actually, it's much more normal to go with these extended periods of time without eating. If you get away from this, "I need to eat every few hours," your body gets very good at dipping into the fat storage, which helps you burn fat and produce ketones, and then you don't really feel hunger, but you do truly appreciate food when you get it because you don't have all these weird chemicals and artificial cravings driving your hunger.

Dave Asprey: It's totally true for adults, and I don't think fasting is really that good for kids, for the vast majority of the time anyway.

Dr. Cate S.: For a long time. Yeah. Right.

Dave Asprey: Yeah. There are good reasons, and kids need some carbs too, at least most of them. They benefit, the right carbs, and not a lot of them and not sugar at all. I don't want to encourage people to [crosstalk 00:17:52].

Dr. Cate S.: Absolutely.

Dave Asprey: I realize that that could be a side effect of this conversation that's unintended. If you're listening and you're thinking, "Great. I just won't feed my kids breakfast," no. I do have to say hunger's a great teacher, to reiterate that, because if you're hungry two hours after you ate, it just tells you this one thing. You did it wrong. Your hunger is your fault, and it's because you ate something that you're sensitive to, or you didn't eat enough fat.

I do that with the kids. They get a little espresso cup, like one or two ounces of Bulletproof coffee, with Brain Octane that raises ketones, which suppresses hunger hormones. They're fine to go through to lunch, but some of their classmates ... They're at a [inaudible 00:18:33] school, and there's a few vegans who get a green apple for breakfast, and then the kids come in and by 10 o'clock they're shaking, and it's time to have a snack. Then the whole class stops. They

all sit down, and they have their little snack, and it's like, "What a waste of time. Could we all just feed our kids enough that they could stay focused for more than 45 minutes?"

Dr. Cate S.: Absolutely.

Dave Asprey: I hope that your work reaches school lunches as well. Honestly, getting there through the Lakers and some of the other sports teams is probably a faster way to school lunches than the things I've done. I've gone to Phoenix. I've spoken at the most obese school district in the country about, "What can we do for our kids?" It's kind of scary. What would you say to a parent of a kid ... Based on all of the work that you've done, what should they feed their kids? What kind of fats are good? How much fat should they get? How much vegetables? Break it down.

Dr. Cate S.: Yeah. The beautiful thing about the way nature arranges everything is that nature does truly try to make it very simple for us. What's good for children, in terms of what kinds of foods, is very much the same as what's good for adults. This is what we break down in our book, Deep Nutrition. We actually have analyzed all culinary traditions to look for what do they all have in common, and our reasoning there was that if there was something that all cultures do that's the same, it's probably extremely important.

It turned out that there were actually four practices that all cultures that ... I guess I could qualify that by saying primary cultures or traditional cultures, where they have not been altered by processed food and fast food and stuff like this. There's four practices that all cultures engaged in, and this is true whether you lived in Alaska or Hawaii or France or Japan. That is the centerpiece of the argument that we make in our book, is that these four practices are what constitutes, essentially, a human diet. It's very easy to adapt them to any cuisine because they come from all cuisines. I could just list them real quickly.

Dave Asprey: Sure.

Dr. Cate S.: They're fresh foods, meaning seasonal and not cooked and certainly not processed, like fresh vegetables, but also animal products that haven't been cooked. Sushi is a really great example of a traditional fresh food. Milk traditionally has not been pasteurized or homogenized. Fermented and sprouted foods, because when you have a lot of fresh food at the end of the growing season, you need to preserve it, and before canning and freezing, you had to work with nature, so fermentation was the way of doing that. Sprouting is what happens at the other end of the season when you've stored seeds or nuts or something for a long period of time, you can soak them in water and partially germinate them so that their enzymes wake up, and it increases the nutritional value of the seed or the nut or whatever it is.

Then there's meat on the bone, which is going to give you the benefits of collagen and glycosaminoglycans. Thanksgiving dinner, we save the turkey carcass, make turkey carcass soup. It's one of the few surviving traditional practices in this country, where we actually get that stuff. Then the last one, the fourth pillar, is everybody's favorite, the organ meats.

Dave Asprey: Yum. Stuff a liver in that turkey, and you'll have leftovers.

Dr. Cate S.: Exactly. This is the first one that fell by the wayside because it does depend on being fresh. Organ meats are very high in nutrition, and a lot of the fats that compose them are very susceptible to oxidation, so they go bad quickly. Then, also, they're an acquired taste. You have to cook them right.

Dave Asprey: I have a question for you there. I've been a huge fan of liver as nature's original B vitamin supplement. There's actually the right forms of B vitamin. The problem is that it doesn't taste very good, but I've done raw lamb liver smoothies.

Dr. Cate S.: Oh, all right.

Dave Asprey: It was absolutely horrifying, one of the worst foods I've ever had, but I drank it anyway.

Dr. Cate S.: You're a warrior.

Dave Asprey: I had to throw the blender away when I was done. It was that bad, but good thing it was a cheap blender. That way I know I'm getting unoxidized fats, but the way I prefer to take my liver is in little desiccated powder capsules, but I've always been concerned that when you powder liver, all of the fats are exposed to oxygen, and you may be damaging those liver fats that are actually very unusual forms of fats that are found almost nowhere else in the body. What's your take? Should I be doing my dried liver capsule powder things? I do it because I know that B vitamins are in there, and I assume that I'm getting oxidized fats, but am I doing the right thing?

Dr. Cate S.: Yeah. Primarily, the benefit there is going to be the B vitamins because those are not significantly damaged by the process of dehydration. Now, what happens when you dehydrate the whole liver is going to be different depending on the source of the liver and exactly details of how that liver was dehydrated. It's hard to say, really, but in general, the fact that it's whole liver and not an extract is good because that means that there's no way that they are removing any of the antioxidants that would be protecting those fats.

You can get it tested. There's a gentleman that works at UC Davis that has been doing these tests, and they're working on how to make it more faster so that it can be a commercially-available test, but one of the most important tests for your health and for your food's health is for the presence of oxidized

polyunsaturated fats. This is what they can test for. It's like mass spectrometry and chromatography and-

Dave Asprey: Wow.

Dr. Cate S.: ... a high-tech sequence of ...

Dave Asprey: How do I get in touch with this guy? I'm always formulating new foods and supplements, and I would actually love to get some hardcore data this way.

Dr. Cate S.: Oh, yeah.

Dave Asprey: Is this a publicly-available test, or do you need to call a guy in the lab somewhere?

Dr. Cate S.: Yeah. More that.

Dave Asprey: All right.

Dr. Cate S.: He's an awesome guy. I've talked to him about, "I know people that would really love to help maybe publicize your work," because he's doing very important work, but people aren't hearing about it. It's a high-tech topic.

Dave Asprey: Well, maybe I should just have him on the show.

Dr. Cate S.: Yeah.

Dave Asprey: Because that would be interesting. This is a conversation that I wanted to go into with you, because you have an unusual background. You're a medical doctor, which means you have one perspective on things, but also you studied biochemistry, which a lot of doctors didn't. You can put on different lenses, depending on how you're looking at a problem, which I always find this cross-functional stuff always makes the really coolest conversations and usually the best programs, because you're just thinking about things in an odd way instead of in group think. Odd is a compliment, by the way. It means not average.

Dr. Cate S.: Coming from Dave. Thank you.

Dave Asprey: Now, when you're looking at something like these oxidized fats, the anti-aging crowd, who I've hung with for many years, that crowd almost universally if you said, "How much omega-3 versus omega-6 fat should you have in your cell membranes?" they're going to tell you, "Four omega-6s for one omega-3." The 4:1 ratio is locked in anti-aging lore. Is that the right ratio? That's still four times more polyunsaturates than omega-3s, or at least omega-6s than omega-3s. Are they wrong?

Dr. Cate S.: You said in the membranes, right? You did not say in the diet, correct?

Dave Asprey: Oh, not in the diet. This is what you get when you measure ... usually just in red blood cells is where they're measuring this. There's a group of people who say, "You have too much membrane fluidity. It's probably not good for you." I was getting nosebleeds at the time, which Eskimos have for eating too much omega-3s, and the most diehard Bulletproofers, some of them aren't getting their ratios down to that level. I figured most people can't avoid polyunsaturated fat. They can't avoid omega-6s, unless you just are obsessive about it. Where do you fall ... because you've really dug in on this. Where do you fall on the optimal amount? Because we've got to have some omega-6 in our diet, because I know I've tried to eliminate all of it. It's really hard to do.

Dr. Cate S.: You brought up two different and very important points. I'm glad you mentioned that they're talking about membrane fluidity. Our brain is pretty much 1:1 on omega-6 to omega-3.

Dave Asprey: Oh, cool.

Dr. Cate S.: Yeah. I mentioned earlier that 50% of our brain by dry weight is fat, and 30% of your brain by dry weight is pufas, and it's half and half, omega-6 and omega-3. I think that that is probably a good marker for perhaps what our red blood cells ought to contain. Although, it's not entirely clear how important it is that our red blood cells have the same ratio as our brain. Let me just back up and explain a little bit about that membrane fluidity and why it's so important that our brains do get the polyunsaturates, both omega-6 and omega-3.

Our brain cells communicate with each other through little packets of information called neurotransmitters, and they touch each other, physically, or almost actually, in structures called synapses. This is one brain cell talking to another brain cell, and in between my hands in the synapse. What happens is when the electrical impulse travels down the end of one brain cell and is strong enough to say, "Okay. We're going to make the leap to the next brain cell."

Then the way that actually physically makes the leap is because the neurotransmitters have to be released into the synaptic cleft. There, they are released, not freely released. They're released in these little bubbles. They're like little water balloons that have neurotransmitters inside them, and the balloon is made out of the fatty acids. That has to happen repeatedly and extremely rapidly. It has to be a very fluid and flexible membrane so that a little bubble can bleb off and then fuse. It can't be highly saturated. Saturated fats are more solid, and they're stiffer, physically. It's this physical property of flexibility and fluidity that is dictating the requirements of our brain for polyunsaturated fatty acids, and that's why there are so many in there.

Now, both omega-6 and omega-3 are very flexible. You could say that omega-3, because it has more ... I know the number's lower. The omega-6 and the omega-3 refer to the position of the first double bond, not the amount of double bonds in there. Polyunsaturated means it has a double bond, for those chemistry buffs

out there who've heard those terms and want to understand why omega-6 actually has fewer double bonds than omega-3 with a lower number. The omega does not refer to how many double bonds there are.

The omega-3s actually tend to have more double bonds and are maybe just a little bit more fluid, but they're both super important to maintain that flexibility. They also have other functions that we talk about in the rest of the body, not so much in the brain, but in the rest of the body the omega-6 and the omega-3 have very different functions when they are enzymatically converted into signals, and these are the pro-inflammatory and anti-inflammatory chemicals that we've heard of, which is one of the confusion points around polyunsaturated fats. A lot of folks say that omega-6 is bad because omega-6 is a precursor for pro-inflammatory, and that's why polyunsaturates are potentially unhealthy in the diet if you have too many. That's an issue, but it's not the thing that I focus on.

To get to the question of what is the ratio, well, that we would have to look to animals, I think. We would have to look to ... because animals are really our best model for what is a natural diet going to do. I'm not an animal physiologist, but you have to take a free-living animal consuming its natural diet, so whether it's a cow consuming grass or ... I guess cows aren't really free living. It'd be even better to get a caribou. Maybe you've got-

Dave Asprey: Or like a pig may be best, in terms of-

Dr. Cate S.: Yeah, a wild pig. Yeah.

Dave Asprey: Yeah.

Dr. Cate S.: Because they're similar, because they're omnivores, right?

Dave Asprey: Right.

Dr. Cate S.: Exactly. Yeah. I believe, distant memory, this is very faint, that animals have a much closer to 1:1 ratio.

Dave Asprey: Of omega-3 to omega-6.

Dr. Cate S.: Of omega-3 and omega-6.

Dave Asprey: They're eating more omega-3s and less omega-6s than-

Dr. Cate S.: Than we are.

Dave Asprey: ... the average ... not the average, but many Americans, and this could be an average, are 40 omega-6s to one omega-3, which is shocking. That's a junk food diet, for sure. It's very hard to achieve the 4:1 ratio and to go below it. I don't

know if it's beneficial. I've seen some people looking at cell membrane composition who are saying ... By the way, the people listening are either super excited about this or like-

Dr. Cate S.: I know.

Dave Asprey: ... "Dave just said cell membrane composition. That's so boring." Anyway, stick with me for a minute here, if you're listening to this, because there is a point that you can take something home for. They found that there were people who were taking way too much omega-3s to try and effect this ratio. In other words, instead of eating less omega-6s, they tried to eat more omega-3s in the form of supplemental fish oil, and they were damaging their cell membranes.

They were getting highly oxidized cell membranes because if you have a lot of omega-3 and omega-6, those are the fats that get more damaged. They get more damaged before you eat them, and they probably get more damaged in the body. I'm a little concerned. There's a few people out there in biohacking circles who are like, "Only eat fish. Only have fish oil," and when you look at the real studies around what happens if you have too much omega-3s, I'm kind of worried about that. Should I be worried? Is this a question of eating less omega-6s or eating more omega-3s?

Dr. Cate S.: It's a little bit of both.

Dave Asprey: Okay.

Dr. Cate S.: The omega-6s come from the vegetable oils primarily. The soy oil and the canola oil are the two oils that are responsible for the most of all of the pufas that we get, that the average American gets, and we get an incredible amount. I did a calculation for Deep Nutrition, and it turns out that somewhere between 30% and 50%, maybe 60% even, of the average American's diet is composed of these vegetable oils.

Dave Asprey: Wow.

Dr. Cate S.: These vegetable oils are industrial foods. They did not exist before the industrial era, and because of their chemical makeup, they're ... It's going to sound a little extreme, but I feel like we should be calling them "liquid death" because they are chemically unstable, like you mentioned, and they promote instability of our own body's polyunsaturates because of something called free radical cascades.

When you have that many in your diet ... We have far more now in our diet than ever before in history. We're consuming 1,000 times more soy oil than we were in the 1900s, in the early 1900s. 1,000 times more. Canola oil, the second biggest source of vegetable oils in this country, didn't exist. In America, we didn't have any until 1985 when they approved it for use. Just to show you that

it is a newfangled thing. It had to be approved the way a drug would have to be approved. Not exactly the same way, but very similar process.

The average American now is composed of far more polyunsaturated fat than ever before in history. Now, what does that mean? Well, it means that when you biopsy human fat tissue, it's composed of a more liquidy kind of fat that is more prone to degradation and inflammation than 50 years ago or than normal. One of the consequences of this is cellulite. We can actually see what happens when our fat is more liquid and more inflammatory, and I'm going to show you a little picture here from Deep Nutrition because I modeled cellulite. If you can see that there-

Dave Asprey: Oh, cool.

Dr. Cate S.: ... on the picture here, this is a normal layer of fat, and this is cellulite fat. Is it coming through okay?

Dave Asprey: It is. For people listening, not watching on the YouTube channel ... By the way, BulletproofExec.com/YouTube will get you to the channel, what we're seeing is we're seeing two pictures. One of them has a bunch of tightly clustered, small droplets of fat in your skin. The other one has larger droplets that are more spread out.

Dr. Cate S.: Also, these dark lines here ... The normal fat has more of these dark lines which represents the collagen that helps keep the fat organized, and that organization enables your skin to stay smooth and not dimple like when you pinch it. Cellulite we assume is an issue when you're overweight, but I've actually seen babies, like three, four months old, that are weaned on this vegetable oil stuff or they're fed it, because baby formula is largely composed of canola oil and these vegetable oils. You can pinch their little tummies, and instead of just nice, smooth, delightfully-buttery baby fat that you're feeling, it starts to dimple in the way that cellulite does.

It's because that inflammation is breaking down the supporting collagen structure. That cellulite fat, instead of having three layers of collagen support, it has only two layers of collagen support. That's in one dimension. In another dimension, there's up-and-down supports as well, and cellulite fat has fewer of those collagen supports as well. It's much more flimsy, and that's why it dimples. That flimsiness is a direct reflection of how the inflammation erodes away the collagen.

Dave Asprey: If someone was to switch to eating more stable fats, which would include some saturated fats, it would definitely include undamaged omega-3 oils and, say, eat a lot more collagen. Yes. People listening know I manufacture grass-fed collagen and all that kind of stuff. Subtle product plug, people.

Dr. Cate S.: Good stuff.

Dave Asprey: If someone was to do that, what happens with cellulite over time?

Dr. Cate S.: There's good news and there's bad news. This is the way nature works. It's like, "Well, you've kind of got to pay for the mistakes you made, but we can help you out a little bit moving forward." The "mistakes you made" category is that there's a very special kind of collagen called ... starts with an F. It's very flexible, and it'll come to me in a second. Anyway, it doesn't really matter, but it's responsible for ... Elastin, that's what it's called. It's responsible for-

Dave Asprey: [crosstalk 00:40:04]. I know that one.

Dr. Cate S.: Yeah. It's responsible for the bounce in our skin, why when we stretch it it bounces back and it doesn't wrinkle when we pinch it. We only get a certain amount of that in our lifetime. In fact, the amount that we get and the durability of this elastin determines the lifespan of the species. It's a very important molecule to longevity and quality of life as you age, but your body only manufactures it under very specific conditions, and it includes a lot of hormones, and we just don't have all those hormones long after puberty. If you're past puberty, you can't make any more. That's where nature's punishing you, elastin.

Dave Asprey: Why not just take a handful of hormones? I mean, we supplement anti-aging hormones. I know 80-year-olds who have 30-year-old hormone profiles. Any reason that someone with cellulite couldn't just take some prolactin or whatever the heck hormones they need to go back and just make new elastin? Do you think that's possible?

Dr. Cate S.: I don't believe it's possible because I think it has to do with the fact that the DNA that makes this stuff is just basically hidden downregulated and exposed, because biology does not want us to live longer. We've got a clock, and they-

Dave Asprey: That's why you have to hack that biology then.

Dr. Cate S.: We're allowed a certain amount of time. Yes, exactly. There's the challenge. It may be possible, but I think it would be very difficult, and you'd have to have a lot of factors and do a lot of testing, but it could be a very fun hack.

Dave Asprey: What about stretch marks? I just wrote a book about everything I could find, including a lot of what you just talked about, because I'm covered in stretch marks from when I was basically before 25. I used to weigh 300 pounds, so I have zebra stripes all over my hips and six-inch scars along my abdomen. They're all bleached, and they look reasonably decent, but I realized when I saw the first one I could have prevented it. I wrote a book with my wife. We put it on Amazon a couple days ago. It's like 100 pages of Everything You Need To Know To Prevent Stretch Marks, but with what you're talking about, is there a hope of reversing them or at least preventing them. I know inflammation's an underlying factor there.

Dr. Cate S.: Preventing.

Dave Asprey: Okay. Prevention.

Dr. Cate S.: Yes. Yeah, and not creating more. Nature punishes you for your past crimes, but moving forward, if you get your diet and your lifestyle in alignment with what nature had in mind for us, it won't continue to punish you, and you won't continue to degrade your elastin. If you do have a little bit of cellulite, once you get your body fat down to a lower number, that cellulite will go away, and you won't get more. You won't get more wrinkles. Unfortunately, though, the weaker your connective tissue is, the lower you have to get your body fat percentage to have no cellulite anywhere. It's kind of not fair.

I have a little diagram about scar tissue, too. This is from the sun, but stretch marks are kind of the same process, and what we're seeing is normal skin that gets damaged from the sun. Then the cells that make new collagen in the skin lay down another layer, but it's disorganized. That's why we can see little lines on stretch marks, because it doesn't follow the same pattern.

Dave Asprey: Right.

Dr. Cate S.: When it's laid down under inflammatory conditions, and in this case, from a sunburn, is quite inflammatory, it's not going to follow the same pattern. That's one of the reasons that on a crummy diet it's a lot easier to not only get the cellulite but also the stretch marks.

Dave Asprey: Let's talk about sunlight for a little while. I've had Dr. Stephanie Seneff on talking about sulfated cholesterol, how sunlight, ultraviolet light, when you expose your skin, or even your eyes to it, it helps to make sulfated cholesterol and very importantly sulfated vitamin D. You're supplementing vitamin D, but it's not activated without ultraviolet exposure. Yet, we also both know lots of people who wear green visors and never allow the sun to hit their skin because they might get a wrinkle. It seems like these are opposite ends of the spectrum. What's your current recommendation for sunlight exposure, and does the type of fat you eat change your susceptibility to sunburn?

Dr. Cate S.: Okay. Great question. Yes. My current recommendation is tied with that, because the fact is that if you have these vegetable oils, this liquid death, in your diet to the degree that most Americans do, that stuff's going to be ... it's stored in the fat under your skin, and it's very susceptible to degradation. The chemical term for that is oxidation and other terms, free radical cascades, but the UV rays actually come in and strike the molecule and fracture the molecule and spark off an oxidative reaction, which is essentially a lot like fire in a forest, in a dry forest. The drier that forest, the more lightning is likely to start a fire, and that fire is the inflammation that you get after a sunburn and the redness. If your diet has been full of these pro-inflammatory fats, you're very susceptible to get really bad red burns and blistering.

Dave Asprey: Yes.

Dr. Cate S.: And then-

Dave Asprey: Just reiterating really quick. For people listening, if you're one of those people, "I can't go out in the sunshine," and you're not a redhead, which means you have genetics from Ireland and you need to live somewhere dark, but other than that, if you really do this, there's something wrong with your diet. You're not getting your polyphenols that modulate the light coming in, or you're eating way too much inflammatory fat. I went from being one of those, "I get red in 15 minutes," to I was in Hawaii, I put on sunscreen twice when I was going to be out on the water for two hours. The rest of the time, I just got a tan. That's what you're supposed to do.

Dr. Cate S.: Yes. Absolutely, because the inflammation can actually interfere with the tanning process. A little bit of inflammation is actually a trigger for the melanocytes, the cells that produce the melanin, that dark pigment which makes us nice and tan, but if you have way too much inflammation, the melanocytes can't function properly either, and so they don't. Your body's busy trying to clean up that inflammatory mess, put out that fire, and it doesn't really ever get the chance to tan properly. Absolutely. That's a great point.

Now, to your prior question of how long does it take to get a new type of fat under your skin, it's not something that's going to happen like if you're planning a Hawaiian vacation in a month. It's not going to fully happen in that month, but you can make a lot of inroads, because just taking away the vegetable oils from your diet and having a lot of fresh veggies is going to enable your body to be able to put out the fires a lot quicker. You're still going to be more prone to forest fires, but with more antioxidants in the system now, that you can have once you get the vegetable oils out because the vegetable oils gobble up your antioxidants, at least now you can put out those forest fires quicker. You'll definitely get a benefit, and you get greater benefit the longer you stay on this kind of diet, the vegetable-oil-free diet.

We have an entire chapter in our book, Deep Nutrition, called Brain Killer: Why Vegetable Oil Is Your Brain's Worst Enemy, and we go over seven, six or seven, strategies as to how exactly having a high-vegetable-oil diet promotes brain problems, including you name it brain problem, whether it's a stroke, whether it's a migraine, bipolar disorder, Alzheimer's disease, or just brain fog, because-

Dave Asprey: All of them.

Dr. Cate S.: Yeah. Every single one. Getting these vegetable oils out of your diet and out of your brain, for me, it is the single most important thing that anyone can do to improve their health, because if your brain isn't working right, it's going to be that much harder to tackle new habits and a new diet.

Dave Asprey: I've gone out with various people who really ought to know better, nutrition experts, fitness experts, some people who work for Bulletproof. I don't judge what other people choose. It's your body, your biochemistry. You can do whatever you want, but I do notice because I'm always asking myself, "Why?" They'll sit down and they'll say, "I want the fried calamari or the tempura," or whatever, and I think to myself, "I've had maybe two grams in the entire year of vegetable oil," and because restaurants use vegetable oil spray, like the aerosol Pam stuff and they don't tell me about it. Otherwise, I don't allow that into my body. What happens if someone eats a deep-fried food one time full of these vegetable oils? What does it do to their brain?

Dr. Cate S.: Researchers in Australia asked a very similar question in 2006, and they published their findings in the American Journal of Cardiology, which is a very prestigious magazine. They looked at what happened when you took a serving of french fries from a restaurant, a standard restaurant, towards the end of the week ... because that oil is used over and over again. You don't know when you get there how old it is. They're recommended to change it once a week, but they don't always do that. Some may change it more often, of course, and they deserve credit for that. One serving of fries, a single serving, in healthy, young volunteers around their 20s, they measured what happens to a physiologic process called endothelial function, which helps regulate your blood flow. As we get older, we lose endothelial function. This loss of function is very important to normal sexual function, also. That's why we associate poor sexual function with aging, because it depends entirely, very hugely, on this ... Hugely, what a good use of that word.

Dave Asprey: I was just going to say I'm glad we're talking, because I'm feeling good about myself right now. I'm just saying.

Dr. Cate S.: It very much depends on the endothelial function to dilate those arteries and get your hugely on.

Dave Asprey: Well said.

Dr. Cate S.: The french fries, one serving, reduced their endothelial function for up to 24 hours. How much did it reduce it? It obliterated it.

Dave Asprey: Yeah.

Dr. Cate S.: There was no endothelial function anymore. You did not dilate at all in response to the normal triggers for dilation, and it lasted for about 24 hours. Effectively, what this shows is that this one serving of fries ages your arteries to the point where you're an unhealthy 80-year-old for up to 24 hours. You do that day after day, and you're walking around with the arteries of an 80-year-old. It definitely impacts cognitive function for reasons we can go into, if you're interested.

Dave Asprey: We'll definitely go into those. I've got to say, eating restaurant fried food is one of the dumbest things you can do. I'll go out on a limb here. It's probably worse than smoking. If I had a choice between smoking a cigarette every day and eating fried food from restaurants every day, I would smoke the cigarette because at least nicotine has some benefits.

Dr. Cate S.: I 100% agree, and I've actually looked into the research.

Dave Asprey: Oh, do tell. This is awesome. Of course, you've looked into it, Cate. That's why you're awesome. All right.

Dr. Cate S.: Because they've tested endothelial function with cigarette smoking as well, and a cigarette impairs endothelial function for up to four hours, a pack of french fries for up to 24, so it's worse. It has more ability to impair ... and this was a modern, fairly-tame cigarette. I forget the brand, but it wasn't a Marlboro. It was a low nicotine, low tar.

Dave Asprey: No [inaudible 00:52:47] nails.

Dr. Cate S.: Yeah. Yeah. Absolutely, it is a worse choice to have a pack of fries than to have a cigarette, and this is something to keep in mind, for sure, if you're pregnant, but the other thing-

Dave Asprey: Oh, god. Yeah.

Dr. Cate S.: The other thing that happens is the cigarette only affects your lungs and your arteries. It doesn't become what your body is built out of. After the fries are through quenching your nitric oxide and destroying your ... that's how they destroy endothelial function, then they get incorporated into some part of your body, and they continue to promote oxidative stress and free radical cascades from there, and they can do even more damage. Actually, once they're fully broken down, they become substances ... I'll just give you two names just to show that I'm not making this up, 4-hydroxynonenal and 4-hydroxyhexanal. These two substances are derived from the breakdown products of vegetable oils that you get when you eat your french fries, and they are known genotoxins, genotoxins meaning they will mutate your genes.

We have a little section in Deep Nutrition where we talk about if you're a dad and you are ... You want to be a dad, I should say. You're not a dad yet. You walk into McDonald's. You have your fries. You get all this genotoxic stuff. It goes to your gonads. It affects how they are able to replicate that DNA, how accurately or inaccurately, you are effectively walking out of that restaurant with older cojones than you walked in with.

Dave Asprey: What would you rather see, a dad three months before pregnancy eating fried food every day or having a glass of wine every day?

Dr. Cate S.: Far and away, the glass of wine, because-

Dave Asprey: Okay. This is just for the listeners, are you guys getting this? Don't eat fried crap, and that includes fried Brussels sprouts at your paleo restaurant. If it's fried at a restaurant, you don't put it in your mouth.

Dr. Cate S.: I just love that you're emphasizing that because I almost feel like there's something where, "Oh, it doesn't count because I don't do it very often," or, "It's just a treat," or something like that. It's a little bit of magical thinking there. "Well, I didn't make it," or, "I didn't get to see it. I don't know what's happening back there in the mysterious kitchen." I really think it's magical thinking. The only way to combat magical thinking is with facts.

Dave Asprey: Yeah. There's another thing we should talk about, just in the interest of giving people actionable information. When you go to the restaurant like, "I'm going to be a good person. I'll order the salad with olive oil instead of your MSG bad-fat dressing," most restaurants today use a blend of 75% olive, 25% canola, and the waitress doesn't even know it. If you say, "Could you check? Because I have an anaphylactic response to canola oil," you'll be surprised at how often they come back and go, "Oh, you can't eat the olive oil." It's to the point I carry Brain Octane in a little bottle, and I pour that and some lemon on my salad when I go out if they don't have real olive oil, because, well, they're doing that, and they do it because they save money. They can cook with olive oil that has a higher smoke point because it's adulterated with toxic canola oil.

This matters more than a lot of the other things you do like ... Okay. Now I'm going to ask you a really hard question. If someone could exercise regularly, let's say someone could exercise five days a week, moderate exercise not like killing themselves every day, they could either do that or they could not eat fried foods every day, which do you think would be a better choice?

Dr. Cate S.: I still say not eat the fried foods because-

Dave Asprey: I do too.

Dr. Cate S.: ... because if you're exercising while you're eating fried foods, it's a little bit like while you're trying to improve your lung health while you're exercising while you're smoking. It's not going to happen. You're not going to improve your cardiovascular health the way that you think you are. If you have a certain amount of will power, a certain amount of ... One thing that you want to do, and you have to choose between starting an exercise program and cutting vegetable oil out of your diet, I would start with the cutting the vegetable oil out of the diet because it will ultimately make you smarter and improve your will power.

Dave Asprey: Yes.

Dr. Cate S.: There's something called executive function, and we cite a study in Deep Nutrition that shows that the consumption of vegetable oils reduces your executive function. Executive function is your planning ability.

Dave Asprey: Oh, yeah.

Dr. Cate S.: One of the big things, big barriers to weight loss, is that folks have certain habits around their diet, and sometimes it's like going home and on your way home you stop through a drive-through because you feel a little bit hungry. If your executive is on vacation, not doing his function, you will not really be able to plan a healthier way home or a healthier meal. When you're eating something that interferes with your executive function, it makes it all the harder to adopt any other healthy habit. It's like you take two steps forward and one step back or one and three-quarters step back, and I hear that so much from people who are trying to lose weight. I really believe that this is why you want to triage and attack the most important thing first, because everything else falls ... If you attack the most important thing, that means everything else is going to be easier to attack next.

Dave Asprey: You totally have cracked the code on this, and it's almost like you're psychic here. When you offer a talk to physicians, they get continuing education credits, but you have to tell the physicians what they're going to learn in your talk. This talk I'm giving at the American Academy of Anti-Aging Medicine, the first learning point for them is how to hack patient complaints.

Dr. Cate S.: I love it.

Dave Asprey: Basically, you cut vegetable oils and you cut things that decrease mitochondrial function, and suddenly you get patients who have enough energy and will power to do what you tell them, instead of the average patient who's like, "I know, Doc. You told me to do this, but I was too tired so I just did what I was going to do," and that frustrates everyone everywhere, including the patient, including the physician. What you just said is classical there. I am of the same opinion, that drinking, smoking, and not exercising are actually lesser sins than eating fried vegetable oil stuff, or just eating vegetable oil but very specifically fried vegetable oil.

Dr. Cate S.: I'm glad you're taking this on because it is something that has been confused in the literature and just basically almost glossed over. It needs a champion.

Dave Asprey: You cover this in Deep Nutrition, which is really cool. That's why I would encourage you, if you're listening to this and this is a fun interview for you or you just need the inspiration or you want the arguments so that when your fat family members with lots of cellulite tell you why, "Oh, just a little bit of canola oil is just fine," if you want the data and you want to understand it, Deep Nutrition is a book that's worth reading for that.

Dr. Cate S.: Thanks, Dave.

Dave Asprey: No. It's really the case. I feel like we can talk for another hour, but we're up on the end of the show. I want to ask you the final question from Bulletproof Radio that I've asked all guests, except that one guy.

Dr. Cate S.: Was it the Walmart smiley face guy that you had on?

Dave Asprey: Exactly. There was one guest where I'm like, "Oh, no. I forgot."

Dr. Cate S.: I don't think he can have a good answer.

Dave Asprey: Yeah. Actually, maybe I should just ask everyone I meet. Anyhow, and longtime listeners will know what I'm about to ask, but if someone came to you tomorrow, Dr. Cate, and they're like, "Look. I want to perform better at everything I do. I want to kick ass at life, not just at one thing. Maybe I'm an athlete. Maybe I'm not. It doesn't really matter," but the three most important pieces of advice you have for someone so they can perform better at every single thing they do, what would you tell them?

Dr. Cate S.: Okay. First one is breakfast is the most important meal of the day not to screw up, and we do screw it up by starting out with carbohydrates and very often vegetable oils.

Dave Asprey: Yeah.

Dr. Cate S.: If you start your day with that stuff, the carbohydrates can put you on an energy high and low. That's a whole other podcast. The second one is going to be the next meal. If you don't have time for a health lunch, you don't have to eat lunch. If you started your day right, you'll be fine without it. Now, maybe not the first day that you do that, but your body gets better and better at accessing stored fat, converting the fat to ketones for your brain to use. Then number three is just make it easy. In our book, we talk about a lot of things that could be very difficult to tackle all at once, getting pastured animal products and learning new recipes and stuff like this, but start with one thing that's easy and make it something that you enjoy, whether it's even just exercising.

I actually worked with Metta World Peace's mother several years ago, and she was very overweight. She was very worried about her health, and her big thing was soda and she didn't exercise. I said, "You know what? You're such a social person. Why don't you exercise with somebody?" I was thinking of her ... get a friend, but she actually took that in a different way and got a trainer. She's lost 120 pounds.

Dave Asprey: Wow.

Dr. Cate S.: That was four years ago, so she's kept it off. Just make it fun. Find something that makes it easy for you, and then that makes it a lot funner.

Dave Asprey: That is really cool. Love that advice. Thanks, Dr. Cate. People can pick up your book where books are sold online or offline. It's called Deep Nutrition. Where can they find out more about your clinic and the work that you do?

Dr. Cate S.: From DrCate.com, my website, which is D-R-C-A-T-E.com.

Dave Asprey: Awesome. If you guys didn't get that, that's D-R-C-A-T-E.com. It's my pleasure to be able to have conversations like this with people like Dr. Cate because there's so much actionable information out there. You can read her book and get more, but if you just walked away with a couple things from this ... Look, eating bad fats is really bad for you. It's way worse for you than most people will say, and Dr. Cate's done a lot of really good research about this and, I think, is one of the leading experts talking about this.

You've also heard from people like Dr. Barry Sears on the show, who discovered eicosanoids, which are one of the things that the omega-6 fats turn into. This is an ongoing thing for the show, but the next time you sit down at a restaurant, don't order the salad dressing, don't order the fried stuff. If you make that your default behavior, you'll actually maybe get more benefit than something that takes a lot more effort, and that's a really big learning from today's episode. Dr. Cate, thanks again for being on the show.

Dr. Cate S.: It was an absolute pleasure. Thank you, Dave.

Dave Asprey: You're so welcome.

If you enjoyed today's episode, you know what to do. Head on over to Bulletproof.com and get a subscription for Bulletproof coffee beans and some of the Brain Octane oil, which by the way will not mess up your cell membranes in any way, shape or form. Very stable, gives you energy, raises ketones, and probably gives you wings or something like that, but no guarantees there. Have an awesome day.