

## Upgrade Your Keto Thinking – Steven Gundry, M.D. – Best of 2022

Dave Asprey:

You're listening to The Human Upgrade with Dave Asprey. Today is going to be a lot of fun because we have our live studio audience, about 65 of them today from the Upgrade Collective, which is my membership and mentorship group. They're dialed in live, they're chatting together amongst each other and with me during the interview. So it's upgrading my ability to ask really good questions. That means I had to have a really, really good guest to be our victim today. And it is-

Steven Gundry, M.D.:

Thank you.

Dave:

... none other than a good friend, Dr. Gundry, a well-known author guy who invented cardio robotic surgery, and just a very, very learned healer across multiple things, including nutrition. I've promised you guys for these shows this year that I'm going to focus on telling you what you're going to get up front, so you know whether you want to invest the time on this show or go to another episode of the show. It's all about the time that you spend and what you get back from it. Because if I convince you to waste your time and I do that to 250 million hours' worth... which is the amount of downloads of the show, I would be a mass murderer.

Since I don't want to be a mass murderer because I'm not in politics or big pharma, I guess I'm going to have to just make it worth your while. So what that means here is, why do we have Dr. Gundry on? Because we're going to talk about the biology behind keto. Some of the stuff you've heard in my early book, like The Bulletproof Diet, but there's some new stuff we know about keto that he's put in his book that's really, really cool, including something called mitochondrial uncoupling. So if you want to solve the thing is keto bad for me? Is keto bad for women? Should I do keto? Should I not do keto?

Well, I have my opinions on that, but we've got another expert opinions with some newer science. I think you'll find a lot of agreements and some learning between the two of us, which is what you're going to get out of this. You're going to get eight keys to unlock the keto code, which is the name of Dr. Gundry's new book. So this is going to tell you when should you do ketosis, when should you do not do ketosis and why? Dr. Gundry welcome back to the show.

Steven:

Thank you, my esteemed colleague, Dave Asprey.

Dave:

Anytime someone with your medical credentials calls me a colleague or anything, but a janitorial staff sort of thing, it's a great honor. So seriously, I write science books. I know a lot, but your medical credentials are just impeccable in terms of what done in cardiology. We've talked about it on other shows but for new listeners, how did you get out of traditional cardiology into writing a book about ketosis? Because that's like switching personalities almost.

Steven:

That's right, I have a split personality. But no, I mean almost 25 years ago my life was changed as a heart surgeon when I met a guy who I called Big Ed... he's a real guy, who essentially cleaned out 50% of the

blockages in his coronary arteries, which were inoperable by changing his diet, and taking a bunch of supplements from a health food store. It was the most remarkable thing I had ever seen, couldn't believe it. So I spent the last 25 years figuring out how the guy did it. I'm still figuring it out, but I'm one step closer now with this book.

Dave:

Okay. It's a constant path of learning, and the very best healers... And I'm not saying just doctors here. You start out with a set of knowledge and training, and then you evolve over time, and you talk to your colleagues, and you talk to researchers, and you slowly incorporate it. But so many doctors that I know go down this path of, "Well, I learned this", and then you turn the crank because you have three minutes per patient. So you don't get a chance to do the learning, and evolving, and self-assessing. How did you during the course of your career, build the time or the process in to do the work it takes to evolve? Because you're very unusual this way.

Steven:

Yeah. So once I figured out that Big Ed did something that was reproducible, I actually, after about a year of doing this with patients that I operated on at Loma Linda University, literally resigned my position and said, "I've got this all wrong. I shouldn't operate on people and then teach them how to avoid me in the future. I should teach them how to avoid me by learning how to eat and never have to operate on them."

"It's all wrong. I shouldn't operate on people and then teach them how to avoid me in the future. I should teach them how to avoid me by learning how to eat and never have to operate on them." As a career choice for a heart surgeon, "That's really stupid", as my wife liked to remind me for 20 odd years. So I actually resigned my position and set up a clinic-

Dave:

Wow.

Steven:

... in Palm Springs. Yeah. I mean I just, one day said, "I got to do this because I think there's a better way, again stupid. So I approached my clinic as a research project, because I've been a researcher all my life and I'd ask people to come in every three months, then I'd tell them, "Look, I don't, you eat certain things. I want you to eat certain things. I want to send you to a health food store, and here pick up some of these supplements. I want to look at your blood work. Every three months and insurance will cover it and let's see what happens." And low and behold you could, absolutely see and track these changes. I started publishing my results because I'm a researcher.

That led me to among other things, the Plant Paradox, which is going to celebrate its fifth anniversary this April. As you know the Plant Paradox was one of those marvelously disruptive books. You and I agree on almost everything in your books and the Plant Paradox, about disrupting things like lectins, so that just kept going. With the Plant Paradox interestingly enough, I saw a large number of people with autoimmune diseases. In fact, my practice has morphed to I'd say 70, 80% of my practice now is autoimmune patients who have been pretty much everywhere in the country, in the world, major medical centers, not getting an answer, not getting any better using pharmaceutical drugs that they don't want to be on. Low and behold published data from me, 94% of people after a year their autoimmune disease is gone, in remission, so that just builds on things.

This book actually came out when came out of my head when I was writing my last book, The Energy Paradox. I've had a ketogenic version of my program in all of my books. I like ketones as you and I know, and you like them as you and I know. But I like to document the reasons I like things, not just conjecture. So I was starting to really dive into the literature and the last book about how ketones work. The more I dove in to even human literature, I realized that "Holy cow, I had been wrong about telling people how ketones benefit you." It was just this epiphany, this aha moment. I went, "Holy cow, I've been wrong about this for 20 years." So I literally called my publisher and said, "There's a book about this." Then they said, "Oh, no we don't need another keto book." I said, "No, no, there's a book about this, please let me write it." So bless their hearts they did. So Unlocking the Keto Code is the results of this new research. So there you go.

Dave:

Well, it's great because we simplify everything. Mitochondria are the power plants of the cells. Actually, it's sort of like saying, "Humans are the warriors of the planet." Well yeah, we also farm and we do a bunch of other stuff. So the fact that mitochondria can make energy, they also make hormones. They also make signaling molecules, they also make antioxidants, and they're also environmental sensors. But no one talks about that, so we get very one-sided, sort of like the war on cholesterol. "Well, let's look at it, it's present, let's just kill it." But the complexities are missing. Right? I know I can use those with you because especially cholesterol, you'll laugh because of your history in cardiology. So let's look at the view of ketones as almost as a drug, because they have drug-like effects that have to do with fat burning molecules.

Steven:

Correct.

Dave:

Tell me the new lens you have on ketones from the book.

Steven:

So I suspect that our audience and our listeners are very ketone trained there. They know what ketones are, et cetera, so we don't have to go back to square one?

Dave:

Let's do the one sentence version because there's always new listeners. I know our live audience is up to speed on it, but there're hundreds of thousands of people hearing us, so-

Steven:

Okay.

Dave:

... someone doesn't know.

Steven:

So ketones have been known about since the late 1800s. The ketogenic diet was actually coined by doctors at the Mayo Clinic in the 1930s as a treatment for childhood epilepsy. It was discovered in the

1920s that children with epilepsy who were starving... and some of these children literally did star because they were having epileptic fits all day. But when they were starving, their seizures went away. When they started eating after their seizures went away, their seizures came back. So some bright people said, "Gee, when you're starving, you're producing ketones, and maybe the ketones are suppressing the seizures. So how do we make ketones besides starving a kid to death, which is not ethical?" They came upon the ketogenic diet, which at that time was an 80% fat diet, 10% carbohydrates and 10% protein.

That was actually quite miraculous. 50% of kids had good control of their left seizures. That diet was really standard of care until drugs like phenobarbital and Dilantin came about. Then it pretty much fell on its face, because people don't realize that the ketogenic diet for kids actually produced growth retardation. Quite frankly, as any parent would know kids really don't like eating 80% fat and not many carbohydrates, they rebel.

Dave:

Yeah.

Steven:

Yeah. I think it's important to realize that we have good human data on a ketogenic diet that perhaps it's not the world's best diet for growth, and maybe we'll come back to that. So what intrigued me after looking at this, the ketones became extremely popular you in the 1970s with work by George Cahill in Boston, with Veech at the NIH. Also, George Cahill's assistant Dr. Owens at Harvard.

Veech, went over the edge, when Veech said, "Ketones are the natural way that we should be. We should actually be starving all the time. And the ketones are actually a superior fuel, and it's superior for the brain. It's superior for muscles." And he made the cover of Time or Newsweek, I've forgotten which. The idea that we should always be in ketosis really caught on. That belief has continued really to this day. That belief quite frankly, based on Cahill's and Owen's work is incorrect. Why do I say that? Cahill and Owens, in human volunteers showed that with fasting... which is the quickest, fastest way to make ketone bodies... which are made by the liver from free fatty acids that are liberated from fat cells are a method of getting fuel into the brain quickly.

Free fatty acids cannot get into the brain they're too big and too slow to move across the blood brain barrier. Ketones, are on the other hand are small water soluble molecules that can get into the brain. So they could provide a fuel source when you can't use free fatty acids in the brain. That's why they came about. But Owens showed that even at full ketosis, humans will only derive 30% of their energy needs from ketones, 30%. At the brain at full ketosis will only at 60% to 70% of its energy needs from ketones.

Dave:

When you say the brain, are you talking about neurons or are you talking about glial cells?

Steven:

So neurons in the brain. How's that?

Dave:

Okay.

Steven:

All right. Yeah.

Dave:

So what I've found was that glial cells preferred glucose and could use ketones, but in studies, neurons would use all the ketones present even in the presence of glucose. So when you look at a brain in total, it wasn't going to get all this energy needs because there was a mismatch and the ratio between glucose and ketones, that was optimal. Are you seeing something different than that or is that still accurate?

Steven:

No, I think that's still accurate. I think the great contributions of Cahill and Veech, was that if a human couldn't use an alternative fuel source to glucose, to fuel the brain, to fuel muscles, then a human would run out of glucose in a matter of days. When you look at how long humans can go starving on a water fast diet, the record is held by Angus Barbieri, for 460 odd days under a medically supervised water fast. So humans can go an incredibly long time surviving.

So what they tried to say is, "Well, the reason we can go a very long time is because of ketone production." I think that's been a mistake, because as I show in the book there's actually a far more important reason that we can go a very long time starving than using ketones as a fuel. Because quite frankly, ketones aren't that great of fuel. So then you have to ask yourself, "Okay, if ketones aren't that great of fuel, what the heck are they doing that makes them so useful and interesting?" That gets back to your comment of ketones are in fact signaling molecules. And [crosstalk 00:16:32]... Go ahead?

Dave:

Dr. Gundry, when you say, "Ketones aren't that great of a fuel", what I've seen is that when you put a ketone into a [Krebs 00:16:41] cycle, it makes more electrons than when you put glucose into a Krebs cycle, which would make it a better fuel.

Steven:

But free fatty acids are even a better fuel.

Dave:

Is that when you put a ketone into a Krebs cycle, it makes more electrons than when you put glucose into a Krebs cycle, which would make it a better fuel.

Steven:

But free fatty acids are even a better fuel.

Dave:

Okay.

Steven:

That's why muscles if they get the choice, choose to use free fatty acids as a fuel rather than ketones. I think that's an important distinction.

Dave:

It is. Is there a type of free fatty acid that the muscles like better? Because you can have lots of different types of fatty acids floating around.

Steven:

Yeah. I don't know exactly which they like better. But to give you an example, we know from race walkers who are on a ketogenic diet, that they can perform equally to a carbohydrate loaded race walker, except they actually have to breathe harder and use more oxygen than they would using a carbohydrate diet. That's actually a key to how ketones actually work in a totally different manner than as an energy source.

Dave:

That's really interesting. It makes me wonder if that original idea of blending butter into yak butter tea that the Tibetans had, what they were looking at was a very low oxygen, low fuel environment and trying to maximize energy production to stay warm. So they had warm liquids, they didn't have to warm it up. They blended it, which makes exclusion zone water that can easily be used to make ATP. I funded the research at U-Dub. So I believe that's real because I've seen it on a microscope. Then it may be that the free fatty acids, the butter, which doesn't have much MCT in-

Steven:

No.

Dave:

... [crosstalk 00:18:54] from yaks. But that may be something that's then saying, "Look, I got a ton of energy in, and the water was prepared so I could actually feel good at high altitude." Because those guys do magic power stuff with no energy. So perhaps it's a saturated fat. In fact, I've got other research about butyric acid is better than corn oil, but we don't, we don't have the research yet. Right?

Steven:

Right, right. Yeah. But one of the things that's really cool about butter is it does contain berate butyric acid.

Dave:

Yep.

Steven:

Not a whole lot, but it certainly has butyric. Tea is actually an amazing source of polyphenols.

Dave:

Correct.

Steven:

As we get into the book, polyphenols are another great signaling molecule that accomplished what ketones do in a different manner. So one of the things that changed my whole thinking on this was, "So

wait a minute, ketones, maybe aren't the world's greatest energy source, but ketones must be doing something else that is very beneficial, particularly if you're starving." So there was a paper and I urge all of your listeners and all the audience today to just pull up this paper from Martin Brand, B-R-A-N-D, from 2000. It's a very simple paper and it's called Uncoupling to Survive. You go uncoupling? That's when you get divorced or you separate from getting into engaged? No.

Dave:

Consciously. Conscious uncoupling. It's a thing.

Steven:

Conscious uncoupling. So it turns out that there is a way to blow off steam, to blow off calorie use by mitochondria when it's overloaded, when it's taxed, which is called uncoupling. It uncouples respiration burning of oxygen from the production of ATP, that's where the term comes from. I wish there was a different term, but it's in the literature, and so I use it in the book and it's too bad because it's hard to explain. Easiest way to explain it is a pressure cooker. If the pressure gets too hot, and the pressure cooker has a release valve and you release steam off the top of the pressure cooker. As you and I know making energy by mitochondria is very hard work. It's incredibly damaging to the inner workings of the mitochondria. Reactive oxygen species, free radicals, you name it, it's hard work.

So mitochondria have a system of literally venting excess protons in the electron transport chain out emergency exits. There are actually five uncoupling proteins that open up pop-off valves, release valves in mitochondria. This was discovered actually in the late 1970s. We now know that ketones actually signal mitochondria to uncouple, to literally waste calories, to literally protect themselves damage. The paper by Martin Brand on coupling to survive, took this to the extreme.

Dave:

Yes.

Steven:

He said... And do you know the paper, Dave?

Dave:

I think I referenced it in my anti-aging book.

Steven:

Yeah. So I mean, it's a fascinating theory. It makes no sense to anyone who thinks that ketones make you more efficient at burning fat. What he said was, "In extremists, when you're starving to death, mitochondria have to protect themselves at all costs because if the mitochondria"-

Steven:

To protect themselves at all costs because if the mitochondria dies, you're done, that's it. Who cares about your muscles? Who cares about anything else without the mitochondria, you end as an organism. So he said that mitochondria will uncouple incredible amounts of fuel from ATP production to prevent damage to themselves. In other words, the pressure cooker release valve is really open. Now that doesn't make sense on the surface because why would you waste fuel?

Well, part two is neurotransmitters tell mitochondria to more of themselves to produce myogenesis, to share the workload. And I use the example, so let's say I have a dog sled and I have one dog, and he's trying to pull through the snow. I'd probably make a lot more progress. If I had six dogs attached to my sled than one, the six dogs would maybe do the exact same amount of... Each dog would only have to do a sixth of the amount of work of that one dog. Now they'd have to eat more, but they'd have to work a lot less harder. So the principle was okay, we're not going to work as hard as mitochondria, but we're going to invite more mitochondria to grow. And you, and I know that

Dave:

Myogenesis is a party, right? You got to do that.

Steven:

Bingo and mitochondria can make more of themselves within a cell without the cell dividing. And so the benefit of ketones is, hey, each of you mitochondria don't work very hard, make more of yourselves to share the workload. And No. 3, because we got to keep you guys around, put in repair mechanisms to make sure everything about you works well.

And when you look at that paper and you go, holy cow, what a crazy weird idea. And now I get it. And then he goes on to show that super long-lived people, and you and I are both into the longevity field, have the most uncoupled mitochondria. And so then you go, wow, maybe this is a very cool strategy for longevity. And as you and I both think the mitochondrial damage theory of aging is a pretty doggone good theory of aging.

Dave:

It's one of the seven pillars. But what we're getting at here, I like to go back to old style cars, which is still the majority of them, the non-electric cars. And one of the biggest things that I did on my Ford F150, keep in mind, guys, I live on a farm where if I bought a Tesla, five years ago, people would've probably chased me down and said, I was too bougie for my neighborhood. So I bought an F150. It had a twin-turbo and all that stuff. But the first thing is I put on new exhaust. I reduced the back pressure on the engine and this raises horsepower quite a lot, right? And what you're describing here sounds like the same thing. You're reducing back pressure on the mitochondria. And it says, oh, because there's less pressure I can afford to have more cubic inches in the engine. I can have a bigger engine, which looks actually more like having two engines under the hood.

Steven:

Right.

Dave:

Because you've doubled the number of mitochondrias. So what ketones are doing is they're reducing back pressure on the mitochondria. And if you don't reduce back pressure, you get more reactive oxygen species. You get more stress on the cell. Right? Am I translating that into the right race car thing and yes, my Ford F-150 did have 550 horsepower when I was done within sounded like a Ferrari, but still wouldn't fit in parking garages. So I traded it for a 10-year-old BMW, there. I don't know what that has to do with anti-aging. But that's what I did also. Twin turbo, zero exhaust pressure. There you go.

Steven:



There you go. Yeah. And actually, in the book, I use the example, for instance, traditional keto says, okay, you're going to turn yourself into an efficient, fat-burning machine and...

Dave:  
Right.

Steven:

Well, it turns out that you actually turn yourself into an extremely inefficient fat-burning machine because you actually turn your mitochondria into Ferraris rather than Toyota Priuses. And a Ferrari, if you wanted to be an efficient user of gasoline, unlike an F-150, you would buy a Prius, which would get you 50 miles per gallon of gas. So let's call gas fat.

Dave:  
But you would never date again, right? If you drove a Prius?

Steven:

Never. That'd be the end. But you could get a deluxe parking place in LA someplaces.

On the other hand, if you wanted to really waste gasoline, you would buy a Ferrari. Now there might be other reasons to buy a Ferrari rather than wasting gasoline, like a prime parking place set your favorite restaurant in Venice Beach, Dave. But...

Dave:  
Right.

Steven:

Right. So the idea that we would be efficient fat burners goes against actually, why a good ketogenic diet would make you lose weight. You actually waste energy. You waste calories by telling your mitochondria to literally pitch a bunch of the calories out of the electron transport chain to literally protect themselves. But at the same time, build more mitochondria. So I think we're both saying the same thing in a different way. And it explains why a ketogenic diet doesn't make you an efficient fat burner. It actually makes you a fat waster. And it's there for a purpose, and we can delve into that even more.

Dave:

So the keto diet makes you efficient at wasting fat. Now there's still probably a dozen of these calorie counting trolls, usually young men, who've been bullied in high school who have these Instagram pages and say, "But Newton's Law! It's calories in, calories out. You can have French fries, as long as you don't have too many and you can work them off at the gym." What do you have to say to that crowd?

Steven:

Well, first of all, none of those nice people ever accounted for the existence of the microbiome.

Dave:  
Oops.

Steven:

Oops.

Dave:

Whoops. I mean, we didn't know about them, come on! I mean, we've only known them about, really, for what, 12 years now?

We did not know the existence of probably the biggest organ system, the most important organ system in our body. We didn't know about it. And we didn't know that, and I've written lots about this, we didn't know that a lot of the good bugs of the gut, buddies as I call, them like to eat the foods that we give them and keep them for themselves and make more of themselves and use up a lot of the calories, what we eat.

On the other hand, as I've written about before, if you've got the gang members, the bad guys, they love to eat sugars and saturated fats, but they like to pass a lot of that onto us. They're actually efficient at extracting calories and passing it on for absorption. Plus they actually, as you, and I know, take over your brain and literally tell your brain to seek out these marvelous, horrible foods for their benefit. So the idea of calories and calories out, No. 1, sorry, doesn't work because the microbiome, but as I point out...

Even if you're very angry, can you make it work just through the force of your anger online or no?

Steven:

Oh no, no, it doesn't work. Then unfortunately you'll be labeled as an aggressor and get kicked off.

Dave:

Oh, that's right. That's right.

Steven:

The really cool thing, and I point this out in the books, there's actually two really cool studies. Actually, there's more than that, but let's talk about MCT oil for a second. Your favorite subject.

Dave:

Love the stuff.

Steven:

All right. So MCTs, as hopefully most of our listeners know, are unique fats. They do not require chylomicrons to be absorbed through the wall of the gut, they, unlike other fats, go direct through the portal vein into the liver. Where they, whether they like it or not, stimulate the production of ketone bodies. So the beauty of MCT oil is that in fact, I hate to say this, is that you could have a fruit salad and put a couple tablespoons of MCT oil in your coffee, Dave, or pour it on your fruit salad, and you would make ketones...

Dave:

You would indeed.

Steven:

You would indeed, even though you're eating a high carbohydrate diet. So, we've done human studies looking at a MCT-based diet versus an olive oil diet, equal calories, and the MCT-oil-based diet lost about four kilograms more than the olive oil diet. Oh my gosh. The exact same calories.

Dave:

But MCTs are actually lower in calories than olive oil on a program basis.

Steven:

They are.

Dave:

Because there's lot electrons in there. So calorie Nazis, all right, let me rephrase that, that's the rude word. Calorie bullies. I don't want to get banned for that. So whatever. So calorie bullies out there, guys, world-leading cardiologists, some weird science guy who drinks, butter in his coffee. The science says that you can just delete your account or you can change what you say. Go to your followers. Say guys, "I F'd up, it turns out different calories do different things to the body. I'm going to learn. And I will lead you on this way."

If you do that, you will take a bunch of people who you are making sick and you'll make them the path to wellness. You're welcome. All right. That was my PSA, Dr. Gundry. Thank you.

Steven:

All right. Now let's take another scenario that I talk about in the book, which also destroys that logic. You take the Italian cyclist study, and you put them on a training table for three months. Everybody's got to eat the exact same food and they have to finish their plate. So one group of athletes eats breakfast at eight o'clock in the morning, eats lunch at one o'clock in the afternoon has to finish dinner by eight o'clock at night, a 12 hour eating window.

The other group of athletes, cyclists have breakfast at one o'clock in the afternoon. Break, fast, guys. Have lunch at four o'clock in the afternoon and have to finish dinner at eight o'clock at night, a seven hour eating window. You follow them for three months. The athletes who have the compressed eating window at seven hours, even though they're eating the exact same calories as the other athletes, lose weight, they keep their muscle mass, their insulin-like growth factor, which I think is still one of the best markers we have for whether mTOR is activated, plummets.

The athletes who ate the exact same food in a 12-hour window, none of that happens. So now you go, okay, same food, different time schedule. One group loses weight. The other doesn't. So, so much for calories and calorie out, what magical mystical thing was happening?

Well, as it turns out, these guys were... Let me back up. Most normal people, and most people are not normal, most people do not have metabolic flexibility.

The ability for the mitochondria to shift from burning free fatty acid or ketones to burning glucose back and forth. In fact, as I talk about in the book, only 50% of normal weight individuals have metabolic flexibility. 50%, that's it. So all of you guys saying, "Hey man, I got a great figure. I'm normal weight." 50% of you are already metabolically inflexible. Overweight people, 88% are metabolically inflexible.

And guess what? If you're obese, 99.5% are metabolically inflexible. Okay. So normally, if you're metabolically flexible, after about eight hours after you ate your last meal, you're actually making ketones. The normal individual makes ketones after about eight hours. By 12 hours, you're really ramping up ketone production.

So the 12-hour guys only had maybe a four-hour window of keto production. The four-hour window, but the other guys had about a 17-hour window where they had an additional five hours where they were making ketones.

And if you accept the idea that ketones were uncoupling mitochondria and allowing mitochondria to do a caloric bypass and turn into a Ferrari, that's why they lost weight, and the other guys didn't. It's the power of ketones, uncoupling mitochondria that did it. Cool.

Dave:

So this is a whole new view on ketosis. And I love it that you're talking about this because I've seen this disturbing trend. And I'm going to just hand it off to Robert Atkins. I have a copy of his book from the year I was born. If only I'd have known about this early pioneer in ketosis, maybe I wouldn't have been so fat as a teenager and a young adult.

So I keep it around as a reminder that the knowledge was there, but it wasn't evenly distributed. So then I realized over the course of time, the type of fat really mattered. That was my question about which free fatty acids, because he's sure, eat pork rinds all day long, It's no problem as long as it's not a carb.

So the "calories are bad" people are wrong. And the "if it's not a carb, you can eat it. I'll cut dirty people today" are wrong. But when I did the Bulletproof Diet, the idea there was cycling ketosis, it had intermittent fasting built-in, it had specific types of fatty acids, but this was through trial and error. But I don't know specifically which kinds the body likes.

I do know that if you replicate the type of fatty acids that you'd find in the brain, it's 45% saturated, which is why I'm like, "Hey guys, eat 50% of your fat calories from saturated." But we don't know. I just know it works. But it maybe it'd be better if it was 32%. It's just the science isn't in any papers I could find.

So you're clearing something out about ketosis that needs to be said, which is that it's a tool, but you don't feed on zero carb, because zero carb breaks your gut bacteria. Which is why cycling at least, or having some prebiotic fiber, is a part of it.

You and I both are huge fans of that. You wrote about that in your last book, we talked about it in one of the, by the way, you're the only guys who's been on, I think, five episodes.

Steven:

Oh my God.

Dave:

I just love interviewing you. So I know we've covered that. Do prebiotics work well with MCTs and with ketosis? Is there anything to worry about there?

Steven:

No, in fact, I think one of the fascinating discoveries that we should talk about, which comes into this. So prebiotics, what good bugs like to eat, are made into, among other things, short-chain fatty acids, like

butyrate, like acidic acid, like [inaudible 00:39:59], and they're also made into gas transmitters, which I went in into the last book. But butyrate is actually an amazing fuel source in and of itself. It's also a really great anti-cancer material. It's a HDAC inhibitor, but butyrate is actually a substrate for beta-hydroxybutyrate, BHB.

Dave:

It's super ketosis, right?

Steven:

Yeah.

But it turns out butyrate and acidic acid, vinegar, also uncouple mitochondria. So you get a one-two punch by giving gut bacteria prebiotic fiber.

Now here's another interesting thing. We'll talk about polyphenols in a second.

Dave:

Yeah.

Steven:

So polyphenols, most people know, that most of the polyphenols that we eat from plants really don't get absorbed directly. Only about 10% get absorbed, but it turns out they're an amazing prebiotic fiber for gut bacteria. And those of us... And we've talked about TMAO in the past, Dave, but...

Dave:

Yes. We have.

Steven:

It turns out that some gut bacteria love to take animal protein, animal fat, and turn it into a compound that the Cleveland Clinic thinks is really deadly called TMAO. Damages your blood vessels. But it turns out that polyphenols paralyze the enzyme system in bacteria so that they can't make TMAO, no matter how much animal fat and protein you eat.

Dave:

Yeah. Which TMAO is a polygenism for animal rights terrorists. They're trying to lie to you to tell you that their bizarre, artificial plant-based only diet is the way to save the planet or you. But it's not because they care about the planet or you. They just don't want animals to die because they don't face reality.

So thank you for that. The TMAO thing, also turns out, choline from soy, also turns the TMAO.

Steven:

Yes.

Dave:

And it's bacteria and that comes from, do you eat polyphenols? Okay. Everyone should eat polyphenols. We can all agree. Sorry. I'll get off my soapbox there too. But that TMAO thing is such a scam.

Steven:

Yeah, it is, and it's interesting. I have several long-time vegan patients, and I take care of a lot of vegans and vegetarians because of my association with Little Melinda. But I have vegans who have TMAO levels in the hundreds and that's impossible according to the Cleveland Clinic because... But you're right. They eat a lot of choline from soy. They eat a lot of soy-based products, and I've literally sent this stuff off the Cleveland clinic, so... "We don't believe it. It's not right. They're eating animals."

Look, these guys are religious, blah, blah, blah. You know, they're perfect Adventist. It would kill them to eat an egg, and yet they produce TMAO. But they don't eat a lot of polyphenols. But ...

Dave:

That's the other thing. Yeah.

Steven:

So let me talk about polyphenols. Here's the other wake-up call. When I started looking at uncoupling, back in World War II, it was noted that munition plant workers in France and Germany lost considerable amounts of weight. They were running a low-grade temperature and no matter how much they eat, they could not keep weight on. And shortly after the war in the 1920s, it was discovered that one of the compounds used in manufacturing gun powder and munitions was 2,4-Dinitrophenol. 2,4-DNP. Phenol, folks. Remember the word phenol.

So enterprising physicians at Stanford in 1930 said, "Son of a gun, 2,4-DNP looks like it was causing these people to lose lots of weight. We don't know why they're losing weight, but it looks really good. So they started prescribing 2,4-DNP as a prescription drug for weight loss.

And it was miraculous. Over a hundred thousand prescriptions were written in the early 1930s for weight loss. If you took a little bit of DNP, you lost about a pound a week. If you took a lot of DNP, you lost up to five pounds per week. I mean, that's a miracle.

The problem was that people started running fevers. They started having thyroid dysfunction. People started developing cataracts and going blind. And this was before cataract surgery. And as I joke, it's too bad you can't see how good you look in that dress, because you're now blind.

But... And then people started to die. So the FDA, in one of its first acts, actually banned 2,4-DNP for sale and prescription. But on the dark web, you can get DNP. Subsequently in 1978, it was discovered that when Peter Mitchell got the Nobel Prize for the electron transport chain discovery, it was discovered that DNP was the first oral mitochondrial uncoupler. And there's been a lot of research. You probably have an investment in a company that makes low-dose DNP or the precursor, and if you don't, you should, Dave.

Steven:

You are the precursor. And if you don't, you should, Dave. But EMP was the first mitochondrial uncoupler that was known. So now fast forward, dinitrophenol. Polyphenols are mitochondrial uncouplers. And can we talk about why plants make polyphenols?

Dave:

They make them, presumably, because many of the polyphenols repel animals, and particularly insects and mold and bacterial infections. So they're defense molecules. And also to protect themselves from ultraviolet light.

Steven:

Yeah. It turns out that plants have mitochondria that we call chloroplasts. And they're mitochondria in reverse. So we use oxygen. And oxygen is very damaging to our mitochondria. And so we protect ourselves against oxygen. You can't live with it, can't live without it. Plants have to have photons from sunlight. But photons, sunlight, is very damaging to plant mitochondria chloroplasts. So plants use polyphenols to, believe it or not, uncouple their mitochondria, their chloroplasts. And when you uncouple mitochondria, they're protected from damage. And you're right, stress elevation, closer to the sun, bad conditions, this is a protective mechanism, a sensing mechanism, to protect the mitochondria.

So when we eat the polyphenols from plants, we in fact harness that power. Somebody said, "Man, it's the circle of life from the Lion King." And it's kind of cute. So the more polyphenols we eat, and then in the book, I just start rattling off all the polyphenols. You're having a delightful polyphenol right now in coffee. You also get the benefit of caffeine, which is also a mitochondrial uncoupler. And on previous episodes, you've dropped a drop of nicotine under your tongue. And it turns out, folks, nicotine is a superb mitochondrial uncoupler.

Dave:

Oh, I got to show you this.

Steven:

There it is.

Dave:

That would be a caffeine tattoo on my left bicep. I had to mitochondrial uncouple my left bicep because it was smaller than my right. I was trying to fix it.

Steven:

Yeah. And so you start looking at the literature and you go, well, wait a minute. How come people who drink five cups of coffee have so much less Alzheimer's and Parkinson's than people who don't drink coffee?

Dave:

Because they're better. They're just better than people who drink only one cup, right?

Steven:

Because they've uncoupled their mitochondria. Smokers. There's a British physician smoker study that I talk about. British physicians who smoke have dramatic decrease in Alzheimer's and Parkinson's than British physicians who don't smoke. Now, I did not tell anybody to go smoke. Do not. If you smoke, stop immediately.

Dave:

But one or two milligrams. There's evidence. I interviewed Dr. Nicotine from Vanderbilt about this, but you're explaining why nicotine in addition to-

Steven:

Exactly.

Dave:

So the performance enhancing aspects, that's where anti-aging comes from, from mitochondrial activity. Right?

Steven:

Exactly. Exactly.

Dave:

I love this. Okay. Question for you then. Nicotine raises PGC-1alpha. What do you know about ketones and mitochondria and MCT oil and all of the other polyphenols and PGC-1alpha?

Steven:

It should increase it.

Dave:

They increase it. Okay. And PGC-1alpha is what happens when you exercise? So all these are like miniature cellular exercise without going to the gym.

Steven:

Right. And myokines actually uncouple mitochondria, which explains one of the benefits of exercise. In fact, when I wrote this book, the title I wanted, but that's another subject, is *The Secret To Life Is Just One Thing, And It's Not What You Think*, from the *City Slickers* movie. So it turns out, if you look at super long people, longevity cultures, and let us not leave Blue Zones before this interview, because I got a blockbuster for you on Blue Zones.

Dave:

Oh yeah, let's do that.

Steven:

But if you look, as I talk about in the book, birds. There's a very popular theory of aging, that is, the expense of energy production. And that basically says the cost of living hypothesis. Little animals don't live very long lives, they have a really high metabolic rate. Bigger animals live longer lives because they have a lower metabolic rate. And you only get so many calories to use up in your lifetime, and then you're done. That's the cost of living hypothesis.

The problem is that birds don't follow that hypothesis. Birds live an incredibly long time. Parrots can live 80 to a hundred years. Hummingbirds in captivity can live 10 years, even though they're burning huge amounts of energy. It turns out that the reason birds live so long is, of all animals, they have the most uncoupled mitochondria. And they get that mitochondria uncoupling, for instance, hummingbirds get retinol from the syrup in the flowers. And birds eat a lot of nuts and seeds, which are loaded with polyphenols. So birds uncouple their mitochondria. So why wouldn't we want do that?

Dave:



And I think that's also why, apparently, hummingbirds who just eat from feeders don't do so well, because they're just getting sugar with no polyphenols.

Steven:

Exactly.

Dave:

But if you put brown sugar in, even, they do better.

Steven:

Yeah. They actually get retinoic acid from the sap in the flower and that's how they do well.

Dave:

There you go, guys. This is mind blowing stuff, when you think about it. Because what it comes down to when you unlock the keto code in the book, we've talked about most of these things. Intermittent fasting or time controlled eating is one of your things. Hallelujah brother. We're so aligned on that. Polyphenols. Heck yeah. We've both been beating that drum for a long time. And I think you introduced new knowledge about polyphenols in this book that's really, really useful specifically around uncoupling activities of some of them, not just antioxidants, and using them as probiotics for the good guys. Which is a big part of the way, I think, MCTs and coffee go together because fat suppresses gut bacteria. But when polyphenols are present, the ones that grow back are the probiotics that eat polyphenols. Those are the ones you want, the bacterio DD's family. So there's this beautiful mix, versus just if you had straight, say, sugar and fat. Fat is antimicrobial, but then sugar feeds the sugar eaters. So that's why it matters so much.

And then you talk about dietary fiber. We talked about that, and how that makes butyrate. We're both into that. The carnivore diet people though, like our mutual friend, Paul, Paul Saladino. I mean, James Saladino, as I like to miscall him a few times and I tease him all the time. I think he's going to end up going with low inflammatory fiber. Not rough fiber, but at least prebiotic fiber because he's already moved from just meat to meat and honey, meat and honey and low inflammation plants. But what would you say to the less flexible carnivore people who say meat is all you need, as long as you eat the whole animal? What's your take on that?

Steven:

So again, I get blood work on people every three to six months. And I have a number of people that say, "I believe it, I'm going hardcore carnivore." And I can tell you that their blood work, particularly a high fat carnivore diet, they have so many markers of endothelial inflammation that you won't pick up on a regular blood test. They have markers of endothelial dysfunction that you won't pick up on a standard blood test. And when I show them this, and every one of them has done it. They go, "Oh my gosh. But I feel so good." I said, "Yeah, you're kind of like the swimmer in Jaws, who's up on the ocean and there's a great white shark coming for him. And I can see the great white shark. And it really scares me. That's because, as you and I know, a true carnivore diet, you really change your gut microbiome for the worse. And I've talked to Paul off camera, and you're right. He has added things other than animals to his diet. And good for him.

Dave:

I actually respect him quite a lot because he's willing to be flexible. And you get dogma in a lot of these, including if it's plant-based, it's good for you. It's an impossible burger. It's probably not. Oh, if it's from an animal, it must be good for you. Maybe not. So there's this nuance. And you cover it really well. And the eight keys from your keto code book are really cool because we didn't talk much about fermented foods as a source of probiotics, but that's one of them. Tell me about fermented foods.

Steven:

Obviously we think of fermented foods as a source of probiotics, friendly bacteria. But the vast majority of probiotics in fermented foods never make it past stomach acid to colonize your gut. No. 1. But there's very good evidence, particularly out of researchers from Stanford, showing that if you take people and give them a high fermented food prebiotic diet, versus a prebiotic diet that the folks who get the fermented food prebiotic diet have much better microbial diversity and much lower markers of inflammation than the people who get the just prebiotic diet.

So you go, well, what gives? It turns out that the fermentation process produces acidic acid. Vinegar also produces several of the other short chain fatty acid. And it turns out that those are signaling molecules that change gut bacteria and uncouple mitochondria. So the beauty is that you could actually have apple cider vinegar, which is going to benefit you by its uncoupling power, not the amazing mother that's in there. And the mother is actually some pretty cool prebiotic fiber. So it all starts to go, oh my gosh, that's how apple cider vinegar works. That's how fermented foods work. Plus, as you know, fermentation is a really good way of breaking down lectins, one of your and my favorite subject. And that probably explains why most traditional cultures let their food rot, let their grains rot, let their beans rot before they eat them or cook them because it breaks down lectins. But it also provides great short chain fatty acid.

Dave:

You know, I have a question. Actually, a couple questions come out from that. One, I feel like a lot of the rotting was around one of the other things, not just lectins, which sometimes cooking removes depending on what they are, pressure cooking, whatever. But phytic acid is a massive issue in those traditional foods. And phytic acid's one of those things that carnivore people don't talk about. And my next book, I'll be talking about that in addition to some other things. But it's another one. In the first chapter of The Bulletproof Diet I'm like, "This is one of those five things in plants that'll trash you." But you still ought to eat some plants, just not the wrong ones. And that's why I love seeing your Plant Paradox book come out, because you really explained it. And you have such credibility, where now you can go into a restaurant and say, "I have a thing with nightshades." And I actually know waiters who go, "Oh yeah." And then they just, don't put red peppers on there. And like, oh thank God. That's cool, because I am one of those people.

But when we get into fermented foods, histamine is a major issue. If you don't ferment it right, or you ferment the wrong foods, especially fermented tofu and all of that, there are tons of people who get mast cell activation, they get hives, they get allergies because they can't handle it. So when you talk about fermented foods, how do I know that I'm not getting a load of histamine in order to get some uncouplers?

Steven:

Well, interestingly enough, I see a lot of people with histamine intolerance. And all I can tell you is, when we repair their leaky gut. And quite frankly, every one of these individuals has leaky gut when we test them. When we repair their leaky gut, their histamine intolerance goes away. And I was talking with

Valter Longo a couple weeks ago and I think we agree on, we agree on a lot of things. But I think one of the things that he's coming around to realize is traditional cultures or cultures that have not been exposed to antibiotics, that have not been exposed to glyphosate roundup, have not been exposed to NSAIDs, have a wonderful, diverse gut microbiome and probably do not have a leaky gut. And so, they have a microbiome that will really take care of most of what comes down the pipe.

On the other hand, I think he's now beginning to research this, we're sitting ducks. Our microbiome is a wasteland. It's desert here in Palm Springs. And most people who come to see me have literally wide open leaky gut. It's not pseudoscience. We can measure it, thanks to Alessio Forzano who's now at Harvard. This is proven science, folks. It's not voodoo medicine. And we can heal a leaky gut. And we can actually turn off these release of mast cells. And that's exciting to me. The other thing I think we should realize is, there's this whole class of fermentation products that are called polyamines. And polyamines, it turns out, are really good mitochondrial uncouplers. For instance, spermidine is a great mitochondrial uncoupler.

Dave:

I'll get as much of that as I can. Yeah. That's really good stuff. You couldn't buy it until very recently. You can only get bacteria.

Steven:

Yeah. And now you can buy it. It's luckily, a few months ago, recognized by the FDA as generally recognized as safe grass. And we've got a product that comes out tomorrow.

Dave:

Oh, you do?

Steven:

Yeah. It's called BioSync. You'll love it. I'll get you some, that has fermenting in it. And a lot of other cool stuff. You will love it. I'll get you some. But that's off the subject. Can I talk about goat cheese and sheep cheese?

Dave:

Yes. I eat sheep cheese most days now, believe it or not. But I want to hear what you have to say about it.

Steven:

So there's a fascinating. So goat and sheep milk, about 30% of the calories in both of those milks are MCTs, medium chain triglycerides. Cow's milk almost has none. Buffalo, water Buffalo, about 30% of the calories are MCTs. So then you go, well, that's pretty interesting. And as you know, Dave, MCTs are named after goat, Capra. Why? Because they were discovered in goat milk. So you start looking at cultures that use goat cheese and sheep cheese. And all of a sudden, two fascinating papers turn up.

The Blue Zones, and folks, I'm the only nutritionist who's ever spent most of my career living in a Blue Zone, Loma Linda, California. Nobody else who writes about it has ever lived in one. They've only visited. They're tourists. So you look at Blue Zones. And let's take Sardinia and Costa Rica, the Nicoya Peninsula of Costa Rica. Two Blue Zones. But Sardinia is an island. It turns out that the only people who qualify in the Blue Zones are the people who live up in the mountains. The people who live down by the

sea don't have longevity. So you compare the diet between the two. And it turns out the folks living in the mountains are goat and sheep herders. And they eat a lot of goat and sheep products. The folks who live down by the sea do not eat goat and sheep products. They're not herders, they're fishermen. Only the folks living on top have the extended longevity.

So now you look at the Nicoya Peninsula of Costa Rica. And yes, they eat a lot of corn and they eat a lot of beans. But this one area of Costa Rica are sheep and goat farmers. And there's two papers, we cut them from the book because it was getting too wordy. There's two papers that say, "Hey, guess what? The reason these particular areas are Blue Zones have nothing to do with the grains and the beans they're eating, because everybody else near them does that. It's because of the goat and sheep cheeses that they eat. Whoa. MCT oils uncouple mitochondria. Wow. And one of the things that shocked me when I moved to Loma Linda and started looking at the food that was served in our cafeteria, over 80% of the calories in our cafeteria came from cheeses and milk products. And I'm going, this can't be good. And yet Loma Linda, it's the only Blue Zone in the United States. So now you got three Blue Zones where cheese is one of their biggest part of their diet.

And that explains the French paradox. They're not killing themselves with triple cream Brie. They're actually improving their health. And as I talk about it in the book, there's some really cool odd chain, fatty acids, C15 and C17, that are a present in milk. And the Framingham Heart Study, folks, the longest running heart study in the world started in the 1940s. The Framingham Heart Study now shows that those components, C15 and C17, are one of the only fatty acids that correlate with avoiding heart disease and long health. Boom.

Dave:

It's amazing, the difference between cow's milk, like a triple Brie and goat and particularly sheep. And I've long been opposed to cow milk for a whole variety of reasons. Mostly because of Gluteomorphins, or sorry, casomorphins.

Steven:

Casomorphins. Yeah.

Dave:

By many people. It is highly addictive and we don't feed the animals the right stuff. So it has the wrong fat. So it doesn't work right. And then casein, which is present, appears to do bad things to your liver. It's not a great protein. In fact, most of the China study, everything in there is based on the fact, because casein can cause cancer, therefore all animal products cause cancer, which is bad logic. But casein itself, there's some pretty good evidence you don't want to load up on it. But when you shift to these other cheeses, the type of protein in them is different, and the ratio of fat's different in them. And you look at also the Maasai People, full fat dairy and blood is pretty much the diet. The first product I ever was going to launch was going to be called Maasai Mix. And it was going to be a mix of blood protein and whey protein, guys, if you want to go back 10 plus years, because it works so well. But I didn't think anyone would want to get it.

Steven:

Probably not.

Dave:

Yeah, probably not. But what I'm thinking here, when we say, cheese is good. I feel like it's saying smoking is good because nicotine is good. I would just say, "Guys, goat and, very importantly, sheep, because sheep appears to be more biocompatible than goat. Do you find that in your studies?"

Steven:

Well, yeah. Although goat milk was traditionally called mother's milk because it turns out goat milk is actually the closest to human milk of any of the animal milks, which is interesting.

Dave:

Yeah. For drinking.

Steven:

Yeah, for drinking. So I think anytime you are separating the whey actually is, no offense, a lot of my patients react whey. But goat and sheep are the GOATS of cheeses. And so yeah. My wife and I eat a lot of goat and sheep cheese on purpose. And just, I go, "Okay, Monica Gundry, we're going to uncouple right now, guys. Let's go." But you're right. American cow cheeses are really mischievous for lots of reason that we've discussed before. Most of the cows in Italy, France, Switzerland are A2 cows. The Maasai actually have A2 cows, interestingly enough.

Steven:

They have A2 cows, interestingly enough, so.

Dave:

Even in those cases, the casing seemed to not be as good.

Steven:

And I talk about this in the book. I have a huge number of autoimmune patients and about 90% of them respond, just following the rules of the plant paradox. But about 10% of them don't, and when we look at those people, almost invariably, they react to all components of cow's milk. And quite frankly, they all react to both egg white and egg yolk. So those are real mischief makers for what I call my troublemakers and I say that lovingly.

Dave:

Okay, it makes a lot of sense. So we are saying that goat and sheep cheese is probably okay, unless you react to it and probably good for you. When I traveled this week around the US, I actually have had a couple pieces of three month aged Manchego, which does not cause the histamine problems that a six or a 12 month aged will do, at least not for me.

And I took some cassava tortillas and so I'd go to a restaurant when I could go. But when I couldn't go to restaurant, I'd just cut some cheese and put it on a little tortilla. And I'd eat, what's basically an uncooked quesadilla. And I'm fine for lunch because I'm going to eat that instead of going to a restaurant eating seed oils and lectins and flavoring additives and whatever else. [crosstalk 01:10:32] If I go to restaurant, I'll put it on and I'll say, "give me a salad." And I just cut it up on my own salad, and then they look at you funny. So that is a way to get protein and fat in when you're traveling and you don't want to just have butter, right?

Steven:

Yeah, no, I agree. I've become friends with many James Beard Award winning chefs and they assure me, you cannot eat gluten free in a restaurant. No matter who tells you what, they said, "just bring your own stuff. You're right." And so, anyhow, that's another subject.

Dave:

When we talk about polyamines, they come in cheese. We went down the cheese slide there.

Steven:

The cheese slide. Yeah.

Dave:

But there are other sources, particularly AHCC, which is a compound extracted from mushrooms. That can work really, really well or eating mushrooms, but eating mushrooms oftentimes gives people yeast problems and there's other weird liver affecting compounds in mushrooms. So I kind of go back and forth. I like them medicinally. I'm a little bit scared of just loading up on mushrooms as a major dietary component, especially raw mushrooms. That those seem particularly like bad idea.

Steven:

The Italians eat a lot of raw mushrooms and I've been impressed eating over there. The number of mushroom carpaccios I've had of porcini in particular, but you're right. I think that if there's any question of people reacting to mushrooms, then cook them. And cooking usually destroys the mischief makers in mushrooms. Interestingly enough, button mushrooms, we test people against different mushrooms and button mushrooms often come up as a food sensitivity in people. We don't see it when they change over to like shiitake or portabella.

Dave:

Wow. I love it that you're saying this, I've got two studies that I put in The Bulletproof Diet. Because people yelled at me for putting them in the caution zone or the suspect food zone. And it's because the studies show that eating white button mushrooms and brown mushrooms increased smooth cell proliferation in vessels. These are real studies, just saying these might have a downside. You can eat them and not die and eat them and get energy, but are they going to make you live forever? So I would agree with you go with the shiitake maitake, lions mane, if you can get it.

Steven:

[crosstalk 01:12:52] Yeah, if you can get it. Yeah.

Dave:

Okay, very cool. And that's where you get your polyamines. It's basically aged cheese. And what about those two year aged cheese or the blue cheeses? Is that necessary or is that going to have other toxins?

Steven:

Well, it turns out there's a cool study that in the longevity paradox of Italian men. Italian men who eat a lot of parmesan cheese, which comes from A2 cows, by the way, live significant... Have much less vascular disease than Italian men in other regions who don't eat parmesan cheese. And I think it's the

polyamines in the cheese. So... And again, it's the uncoupling effect that these things have. And there's oodles of literature looking at the uncoupling effect of polyamines once you start going down there rabbit hole, which unfortunately I did... or fortunately I did.

Dave:

And the spermidine thing that you've got coming out in your product line here... Spermidine in studies, when I published Superhuman, this was like three years ago.... The study is showing almost a doubling of lifespan of rats who got enough of it. I'm going, I can't buy this stuff. I'm going to import probiotics from Japan to get spermidine in my gut. But it turns out if you eat spermidine the bacteria will grow in your gut anyway. So having it in a formula is a really good idea. So I love it. So we've covered now from your eight things in the book we've covered intermittent fasting or time control. We've covered polyphenols, we've covered fiber, specifically soluble fiber or prebiotic fiber. We've covered fermented foods. We've covered polyamines, which includes some fermented foods. And there's two more cold and hot.

Steven:

Cold and hot.

Dave:

Heat shock protein happens to... That would be saunas or exercise, both make that happens to-

Steven:

[crosstalk 01:14:40] It just happens to uncouple of your mitochondria, [crosstalk 01:14:44] who would've known? And it turns out cold therapy does the exact same thing. And so that's really cool. And then I mentioned breath control. It turns out that carbon dioxide is really an impressive neuron, if you will, love fest. And I devote a number of paragraphs to the fact that Wim Hof and others who practice breath control, including Buddhist monks. That breath control actually uncouples mitochondria so much that you produce huge amounts of heat. And that's how Wim Hof can swim under the Arctic circle and miss his hole and still survive. So he can go a long time. And that's how Buddhist monks can actually dry wet towels or melt snow just by meditating, because they've actually increased their carbon dioxide. They don't lower their O2 and people always wonder. But they increase their carbon dioxide, which uncouples mitochondria. And here's another thing you and I both love San Pellegrino for its sulfur content. And there it is. It's got CO2 folks and drink your CO2. That's in the book too. And who knew?

Dave:

I used to study this on airplanes. So I would look at my spO2 using a meter. And I noticed that if I drank carbonated water on an airplane that magically my O2 saturation would go up and we know that CO2 is a magnet for oxygen. I didn't realize it had an uncoupling effect, but it makes sense. And guys, I'll do this too. I don't recommend you do it. Because this comes from the interview with James Nestor and his book. But he says, so if you were to breathe a bag of carbon dioxide, that it makes you feel like you're going to die. And it's this horrible thing.

I'm like "I got to try that." So I took my soda jet thing that carbonates water and I just filled a bag with CO2 and I took a huff. You don't feel like you're going to die. You feel like you're in a sauna, like a sweat lodge. And you're about to go down so you just... and you lay down and then you kind of... the world spins a little bit and you can't overdose on one bag. But it, you get warm all over afterwards and it's causing a metabolic effect throughout the body, but you're going to lay down for that. So there's

reasons to do this. And it turns out we knew this for anxiety specifically. It magically fixes anxiety. Remember the old 1970s hold a bag and.

Steven:

Oh yeah. Works every time.

Dave:

You could just huff off your soda stream. There you go. The soda stream guys hate me right now. Like, "oh God, we have to do a [crosstalk 01:17:36]."

Steven:

Yeah, don't do that. Don't do this at home. Professional driver on a closed course, folks.

Dave:

And yeah, it could have weird cardiac effects I guess. But one breath full of CO2 is usually not a big deal. And since it's been written about in lots of books and it's done in non-medical settings, but yeah, it is pretty intense. So if you guys decide to try it is at your own risk. I don't really think you should. I would love for there to be CO2 clinics out there, but there aren't any yet. Okay. So we've got that. We've got cut hold. And your final one is something that one of my companies specializes in, red light therapy.

Steven:

Would that be red light therapy?

Dave:

Could red light therapy be uncoupling? Could true light have been right all this time?

Steven:

Believe it or not. It's one of the best mitochondrial uncouplers there is. And the really cool thing about it as you know, it actually penetrates fairly deep through skin. And there's some new interesting studies that depending on the wavelength, you can penetrate the skull. And it really uncouples neuron mitochondria. And as far as I can tell, I want my neuron mitochondria to uncouple. So they'll make more of them.

Dave:

We have, at Upgrade Labs, we have a brand new whole body red light. High, high, intensity, the highest intensity that's out there device with red infrared and amber. And I just tested it out. It's at Beverly Hills, now. It's the first one, but all of our Upgrade Labs franchise facilities will have one of these. And I would call these best in class by far in red light therapy. And I'd love to get you in one of those whenever you're in LA, I'll give you a session. But, and for listeners, if you go to [ownandupgradelabs.com](http://ownandupgradelabs.com), that's how you can look at being a franchiser because... or franchisee, because we're opening these around the US and Canada right now. So it's kind of cool, but I want to get this whole body high intensity light therapy to as many people as possible. Because it really makes you feel different, right? So we've got just a final list and guys, you need to buy the book, right?

Steven:



Yeah, get the book folks.

Dave:

The Keto Code. There there's way more in the book than I'm going to get out of this interview. But I like to teach on these. So intermittent fasting, polyphenols, dietary fiber, fermented foods, polyamines from cheese and mushrooms, cold temperatures, hot temperatures and red light. If you did those things, you've basically removed the entire stubby exhaust system on your mitochondria. So there's no back pressure so they can just make huge amounts of horsepower. And you can use that extra horsepower to aim the loud exhaust at the people who are weakly and meekly saying, "but it's about calories, but it's about calories." You won't need to be able to hear them because the sound of your exhaust is so loud in their face. There.

Steven:

I'm glad you got that off your chest.

Dave:

It was weighing on me. I got to tell you. Now there was something else about blue zones and I'm going to have Dan on the show. I said a comment about some of the mistakes of blue zones. I actually respect Dan, Dan Buettner.

Steven:

I do too. I do too.

Dave:

He's a well-meaning smart, intelligent guy asking hard questions, writing really good books. And so he reached out on social and he was like, "Dave, you said mean stuff." I said, "Dan, I was really respectful in my comment here, but why don't you come on the show and we'll talk about it?" And one of the...so he is going to come on the show. I mean this... I'm not a takedown guy. Except kale. I'll take kale down.

Steven:

Very good.

Dave:

Aside from that, there's the notion of high in the mountains in those regions, there's very little record keeping, there's poverty and there's high taxes. So there's some documented evidence that some of the blue zones, there may be some people who took over for their parents so that they didn't have to pay death and property transfer taxes. And that's a common element in most of those things, but not in Loma Linda. But I am really intrigued that you're saying, "Look, 80% of your calories come from cheese, not beans." Then we could say, "Screw the beans, eat the cheese. And maybe some sausage."

Steven:

50% of the calories.

Dave:

Well I heard 80. 80 made me laugh. So 50%? So there you go.

Steven:

50% of the calories. I mean that's a lot calories.

Dave:

I believe half your calories should come from fat. At least half should come from fat and at least half your fat should be saturated, right? And I could be wrong by a little bit, but they're actually doing exactly that. I did not know that. So you really taught me something that I'll ask him about on that as well. Now when you get into fats in your book and I know we're coming up on the end of the time we've got, but if you're okay for another couple minutes, I want to talk about saturated fats in particular. If you're okay. All right. So tell me about long chain fatty acids and what they do to inhibit weight loss.

Steven:

So there's some rather interesting, actually animal and human data that certain long chain fatty acids will actually promote insulin resistance. And one of the problems with weight loss is insulin... As you know, is No. 1, a fat storage hormone, but No. 2, insulin normally should go up after we eat to usher sugars and proteins into cells. And if cells are full, then insulin will usher what's ever else into fat cells. But if you are eating a good design would be, if insulin's up, you shouldn't be taking things out of storage because you're eating. And so insulin blocks the release of fat... free fatty acids from fat cells. It blocks hormone sensitive lipase. And so most people are frustrated by starting a ultra-low carb ketogenic diet because they're insulin resistant. And they have a high insulin level and it's kind of like water, water everywhere. You got plenty of fat, but you can't get to it.

And it may take, literally... and I see this in my patients, weeks, sometimes months to drop your insulin level to where you can start doing free fatty acids. I'm doing a little experiment with myself with another device. And I purposely made myself insulin resistant. I won't tell you how, but it took me three days on actually a water fast to start producing huge amounts of ketones like I would normally do overnight. So I think it's very real. But long story short, long chain and fatty acids are not necessarily your friend. And I detail in the book, which ones are your friends, which ones you ought to be careful. And there's an ultra-long chain fatty acid that is primarily in macadamia nuts and believe it or not canola oil, organic canola oil, folks. That looks actually quite interesting as from the Framingham heart study, but it's present in cheese. So, every cheese.

Dave:

So you've completed this discussion really well. Because when you think about it, oh my God, different fats could do different things? So when mice were on a high fat diet, it is meaningless unless you know what fats they were on. And you've done this conversation around, okay, which fats do what in the body? Another thing there's VLC fatty acids... very long chain.

Steven:

Very long chain. Yep.

Dave:

There's some found in peanuts. They're so long that they don't fit in the cell membrane. So they get in sideways and people who eat a lot of peanuts have a higher risk of Alzheimer's because Alzheimer's brains have too much of that kind of fat. But was it a high fat, or was it MCT oil, which is also a fat? They

don't even do the same thing. So high fat... you can't say fat's bad for you. Margarine's bad for you, fish oil's probably good for you in moderation, right?

So you've gone through in your book and you said, "Here's the fats to do, this is where Atkins got it wrong." He's like, "If it's fat, eat it. If it's a carb, don't eat it." Right? And that was the start. It was brilliant. And his later work started to make the changes. But this is foundational. And you need to understand this if you want to live a long time. And more importantly, if you just want to feel really good. So I appreciate that you went into that because it's hard to explain different proteins do different things, different fats do different things, different carbs do different things. And so, we've got to get that right. And we've got to put polyphenols on top as well, which is really cool. Okay. Dr. Gundry, one final question for you. Alcohol. Good for you? Bad for you?

Steven:

Well, so it turns out that red wine not only has polyphenols and lots of different polyphenols, resveratrol, quercetin, but interestingly enough, red wine has melatonin in it. And as I conjecture in the book, one of the theories of the French paradox may not be the resveratrol, but actually the amount of melatonin in it. And we haven't even touched on melatonin, but alcohol in and of itself is a mitochondrial uncoupler.

And that's why you can have a cold beer, please don't, because it's loaded with lectins but that's another subject. But you can have a glass of a cold martini or a cold drink with alcohol and you will notice that the room gets real hot and you may even kind of get drenched. And that's the uncoupling effect of alcohol. When you uncouple mitochondria, you produce heat and it's actually that heat production that is... Here's one of the amazing things. 30% of our mitochondria at rest are uncoupled. And why would we waste 30% of the calories that we eat? Well, it turns out, No. 1, you got to protect mitochondria. But No. 2, uncoupling mitochondria produces heat and we're a warm-blooded animal. And believe it or not even cold-blooded animals are actually warmer-blooded than people think. So we use uncoupling to produce heat. That's why, when you have a drink, you get kind of glistening.

Dave:

That's why St. Bernard rescue dogs in the Swiss Alps and places like that have a little cask right here, full of brandy or something. So that when you're freezing to death, you drink it and you get hot from uncoupling. Right?

Steven:

That's correct. That's exactly right. That's actually why they had it. We didn't know that's why they had it. But yeah, they get hot.

Dave:

[crosstalk 01:28:27] Made you warm. There's been so much cool knowledge here. And your comment about taking that low dose thing that's been banned. The FDA has a history of banning things that work really well because people do stupid things with them. I haven't tried it. I'm familiar with it. And I don't think you guys necessarily need to go out and do that. There's plenty of knowledge in the Keto Codes and in many other, just in the last 10 years, we've learned so much about our gut bacteria. We've learned about lectins. There's so much you can do. So learn about the eight things in the Keto Code and give it a try. You're going to find that you can change the amount of energy you make. And what we learned today is that you're actually making sure that your body can make enough heat and that there was enough back pressure on your mitochondria so that they can work without being constrained.

So that's just new learning in the world of keto. And thank you for getting us out of dirty keto bro mode and getting us out of excessive fasting mode and bad fat mode. So you're doing a one at a time instead of all in one book, which is, I think a much more digestible way to do it. Dr. Gundry, my friend, keep doing the cool stuff you're doing. I can only imagine that you've also got some kind of robot doing cool stuff behind you because you do just so much fun stuff. Keep it up.

Steven:

Yeah. I got a picture someplace.

Dave:

Awesome.

Steven:

Thanks a lot of Dave. Appreciate it. Thanks.