

The Sugar Hill, Part 2

Research into the nature and dangers of chronic calorie-dense carbohydrate consumption

Transcript of: The Sugar Hill, Part 2

Description: Steve continues with his description of his four-month focus upon dietary carbohydrate and explains the experience and biochemistry associated with his surprising switch into the state of "nutritional ketosis" which occurs whenever humans consume a non-carbohydrate-based diet.

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Leo Laporte: This is TWiT Special #125: Steve Gibson and The Sugar Hill, Part 2.

Hello, everybody, and welcome back once again for Part 2 of our Steve Gibson special. Steve Gibson, as everybody knows, is the host of Security Now! on TWiT. He is the author of SpinRite. He's a computer scientist. But as a scientist, he's also very interested in a lot of things and takes his scientific point of view and applies it in, I think, a very useful and interesting way to many subjects, in this case diet and health, and particularly how nutrition relates to health.

If you're listening for the first time, I would invite you to listen to Part 1 of our Sugar Hill. It's TWiT Special #124. You'll find it at TWiT.tv/specials. And then come back and listen to Part 2 because this is going to be the kind of more practical point. Welcome, Steve. Good to see you.

Steve Gibson: Hey, Leo. Great to be back with you for our second installment of this little adventure. As listeners of Part 1 know, I sort of surprised myself first, and then you and everyone else last week, by recounting my adventure when what I was just doing as low-carb turned into a new phenomenon for me, ketosis. And I then embarked on figuring out what all that means.

Leo: Now, say not another word until I give the disclaimer.

Steve: Good.

Leo: Steve is not a dietician, registered dietician, nutritionist, physician, has no scientific standing in this matter whatsoever. He's just a smart man with some really deep interest in this, and I think smart enough, and one of reasons we love talking to Steve about this kind of stuff, to look at all the science and analyze it, I think intelligently and intuitively. But before one embarks on any modification of one's diet and nutrition, it would be a good idea to check with experts that you trust, particularly your personal physician.

And this diet that Steve is going to talk about - and when we say "diet," by the way, we don't mean a temporary change in diet, we talk about how you should be eating going forward - is somewhat controversial with some. Dr. Mom has talked about this a little bit. And certainly there's no doubt that, if you have any health issues, particularly if you have trouble, liver troubles, kidney troubles, heart issues, that you should absolutely not consider doing this until you ask your doctor because it could be dangerous for somebody with kidney problems, for instance.

Steve: Well, and, for example, one of the things that this sort of diet has been shown to do is to increase a person's response to insulin, which is to say decrease their insulin resistance. So for somebody who's under doctor-prescribed medication to regulate their blood sugar, then a change like this would have an impact there. So I would say the right approach is to listen to this stuff. Nothing that I have in these podcasts or even on my site is meant to replace the wealth of information which is available already in books, popular books and textbooks and so forth. At GRC.com/health I now have a health resources page with a number of books that you and I have both read, Leo. And so I would encourage someone to educate themselves further, then talk to their doctor and say, hey, I want to try, I want to experiment with a low-carb change to my eating.

Now, your doctor may think you're crazy. And if he talks you out of it, then that might be good for you. But if nothing else, he can say well, I don't think that's going to matter, but okay, let's do that. And so it makes sense to do that in a partnership with your physician because the last thing any of us would want would be for any of this to hurt anyone. I mean, that's certainly not the idea. The goal is to have it only help people.

Leo: Yes. So just to kind of get us back to where we were last time, you talked about your discovery of ketosis, that you were in ketosis because your pee smelled funny, and your breath smelled kind of fruity.

Steve: And my skin was. And then I was able to detect it with the Bayer Ketostix, which were created more as a means for diabetics to check to see whether they may be in ketosis, which can be very dangerous for diabetics - again, another reason why anything you do like this you definitely want to do it with a doctor. And probably the most often-asked question that came through Twitter - and also I have a feedback page now in that health region of GRC, a lot of really great feedback from people. But everyone wanted to know, well, okay, Steve, what is your diet? What are you eating?

Leo: What do you eat? And, you know, one of the things that's interesting about paleo and all of these kind of - and I think this is kind of a common - you're seeing a lot of this. There's Atkins, there's no-carb, there's paleo. One of the common threads is that the processed foods that we see so much in the grocery store now, that we eat so much of, are causing what is clearly an obesity epidemic in the United States. There's an epidemic of Type II diabetes. There is an obesity epidemic that is dramatic over the last 10 to 15 years. And there seems to be some consensus, at least among most people, that it has something to do with the processed foods we eat. And so that's one of the things that's stimulating this interest in, well, what did we eat before there was agriculture? What's the natural human diet?

Steve: Right. And one of the terms that, unfortunately, is not well defined is "paleo" because "paleo" is the buzzword now - paleo diet, paleo eating, blah blah blah. And

exactly as you said, one concern is processed foods. To me, the way I got into this was by saying, okay, agriculture is a recent creation. It's a fantastic invention because it literally now feeds the world. It's a process by which we're able to create extremely high-calorie crop yields in a controlled and relatively small space in terms of the amount of calories that we're growing out of the ground. And that pure calorie potency of things like wheat and rice and corn and other grains and starches allow a much greater density of calories per square foot of crop space than we ever had pre-agriculture.

Leo: Well, and there's also the issue, as Dr. Rosedale points out, that it turns out these processed foods and these carb-loaded foods are easier to store. It's a lot harder to store fresh fruits, vegetables, fish, and meat, and a lot more expensive to transport, than it is something heavily processed, put in a box, loaded with carbs.

Steve: Yes. Yeah, it's a very good point. There's also, I mean, we do live in a free enterprise, capitalistic - at least in the United States - environment where high profit creates high incentive. And the center region of supermarkets, as opposed to the periphery of the supermarkets where you generally have fresh food and produce and things, the center are aisles of this - essentially calories which can be shipped in bulk, have long shelf lives, don't have to be turned on, don't have to be sprayed with water. It's very convenient. So there's a whole economy that has risen up around this notion of what we can do with corn flakes and cookies and crackers and cereals. I mean, from a standpoint of providing energy, this whole system is incredibly cost-effective. And arguably, it costs less to purchase those kinds of calories, actually much less per calorie, than to buy produce, which has all the overhead of needing to be fresh. We're worried about how it was sprayed, is it organic, is it fresh and so forth. So there's that, too.

So for me, I was looking at, okay, what happened before agriculture? Because in terms of man's total history on the planet and the evolution that we know from looking back at Paleolithic records had been going on for millions of years, this creation of very calorie-dense food is very recent. And one way to think about that is that carbohydrate can come in two different major forms. It can be starch, or it can be cellulose, just based on the way the glucose molecules are linked together.

But fundamentally, all carbohydrate of either of those types is glucose. And we only have digestive enzymes that allow us to digest the starch form of these long chains of glucose. We're unable to digest the cellulose. And so that's what we call "fiber." That's the part that just passes through us unchanged. But, for example, termites do have enzymes for digesting cellulose. That's what wood is. And so, as we know, termites eat wood. And there are other animals that are able to digest plant matter which we don't. They actually get caloric energy from it. For us it just creates, as we know, bulk in the form of fiber and moves through us without giving us calories.

So one way to think about this, sort of an inversion which has happened, is the pre-agricultural plants that were available had a high cellulose content and a low starch content. And because of the fact that we're only able to digest the starch content, they had a low caloric content. But what we did with agriculture was we flipped that over so that we're now creating - because we want calories. The goal is to create lots of calories so we can feed lots of people. So we flipped this over, and we learned how to create high-yield crops which are low in cellulose and high in starch. And again, since we digest starch, we get all the calories out of that with much lower fiber.

So my quest began with, okay, looking around at us, the traditional wisdom for the last couple hundred years has been that eating fat is bad for you. Eating fat makes you fat; eating fat raises your blood fat; and that the healthier way to eat is to lower your fat

intake and eat more nonfat, no-fat carbohydrates because there's no fat in carbohydrate, this kind of rice and wheat and corn and so forth.

Leo: There's really only three choices. It's fat, protein, or carbohydrate.

Steve: Correct.

Leo: So you eat less fat, you're going to eat more carbs. Or more protein.

Steve: And that's exactly right. Fat, as we know, is very calorie dense. It is four calories, or actually it's kilocalories. It's actually thousands of calories because a calorie is so small, but they just throw off the - we ignore the "K." It's always assumed, so that we're not having to say 9,000 calories, we're able to say 9 calories, which is actually 9 kilocalories. So fat is very calorie dense. And so when you create low-fat food, for example, in order to make it still taste good, you have to put the calories back in. And so that's typically done by adding sugar or adding - and sugar, of course, is like the fundamental carbohydrate - adding that back into the food to replace the calories. And just in terms of surviving during the day you need to replace those calories.

So I stumbled into ketosis by, as we discussed last week, by inadvertently, well, deliberately eliminating all of that from my diet. I wanted to experiment with some things that studies had shown would happen if you weren't eating these calorie-dense foods, these grains and starches. Specifically, there is the growing belief that these are not good for us. And it's hard to nail this down because people's sensitivity to these sort of, we'll call them agricultural grains and starches, varies across a whole spectrum. Some people are clearly made ill by them. For example, we know about gluten sensitivities and celiac disease and those problems. So sometimes the problem is overt. In other times, there really does seem to be a correlation between the consumption of these and systemic inflammation, heart disease, insulin resistance, and diseases that we often associate now with - we would call them diseases of aging.

So one of the things that happens is, when we eat these grains and starchy foods that contain a lot of calories, blood sugar is increased. That has the effect of causing our pancreas to secrete insulin in order to get our cells to accept the glucose from our blood in order to bring that back down. But as we overuse that system - and again, overuse relative to the way, arguably, we evolved pre-agriculture - it seems that there's a spectrum of problems that can be created.

So I experimented for several months in eliminating grain and starchy foods. And what I was looking for was some long-term change in some of my hormonal parameters to see if blood glucose did go down further, could I see the insulin sensitivity was increased because I was generating lower levels of insulin and a number of things. Then I stumbled into the whole ketosis, which is a fundamental change in our metabolism. And essentially what it means is that we are changing the way our bodies function to burn fat rather than to burn sugar. Our bodies want to preserve fat, and so they won't let go of it very easily. If we keep providing carbohydrate to our bodies - and I don't mean, for example, salad and salad vegetables carbohydrate, but these high calorie-dense carbohydrates - wheat, corn, rice and, for example, potato starches. Then our body will not switch over into fat-burning mode. It continues to wait until it gets another hit of sugar, and it takes a number of days of denying it of any of the sugar for it to be begin to make this kind of transition over into that mode.

So the idea is to, well, what ended up happening was I wanted to experiment then with ketosis - what is this about, what does it mean, how does it work. And what you and I discovered, Leo, is that we have pretty similar diets. You're eating more berries and fruit than I am. But our diets have ended up sort of converging towards the same sort of set of foods.

Leo: Well, I think you and I both started at a somewhat similar point with the Gary Taubes book "Why We Get Fat," and then his predecessor, the more detailed "Good Calories, Bad Calories," which the idea of eliminating carbs, yes, and eliminating processed foods, yes. But where there is some dispute is how much meat you should eat, or how much protein you should eat. And I tried it. And yes, you can lose weight. But I felt very uncomfortable eating so much meat. And as it turns out, as we've refined this, it may not be as much fun as having bacon and steak all the time, but it may be a little bit more healthy to cut back a little bit on the amount of protein in our diets.

Steve: Okay, well, so from a chemical standpoint, here's how that works. The protein that we eat is - it's built up from amino acids. And our body needs a bunch, there are a bunch of amino acids that are essential. So we have to have a source of those somehow. Animal products naturally contain a wide range, a full range of amino acids. So one way to get them is through that. I know that vegetarians who resist any consumption of animal protein, they work to eat a range of foods that gives them the complete spectrum of amino acids that they need. But that certainly can be done, too.

The problem is that our body only requires a fixed amount of protein on average per day. And it's something like 0.6 grams per pound of body weight, which is - I think it's about 1.5 grams per kilogram of body weight. And there are lots of people who believe that you are able to build muscle faster or bulk yourself up with muscle by consuming greater than that amount of protein. However, close studies haven't actually shown that you can push your body to build muscle faster than it wants to. So there are rate-limiting metabolic paths there that you just can't short-circuit.

What does happen when you consume excess protein, more than your body needs, is it is converted to glucose. So there are metabolic pathways - it's called gluconeogenesis - in our liver that convert excess protein into glucose. And as an emergency measure, if we were really starving, then our body can attack its own muscles and take our muscle protein and convert that into sugar in order to keep us alive. It doesn't want to do that. It would rather preserve muscle mass. But if we die, then we don't have any chance for a future. Even if our muscles are taken down a ways, that may get us out of whatever problem we're having finding food, and then we're able to rebuild the muscles.

So in diets like this, where we're deliberately bringing our total number of carbohydrate calories down, the question is, okay, if we refuse to consume a large number of carbohydrate calories, what do we replace those with to give our bodies the energy they need to go every day? And as you were saying, Gary Taubes has taken the approach that some people do of replacing it with a heavy meat diet.

Leo: Atkins will do this, yeah.

Steve: Yeah. And the problem there is, as I was just saying, is breaking down this protein can also be rough on your kidneys, if you really protein overload. And you're not

really achieving what you want of bringing your sugar down and switching over into a fat-burning mode because excess protein does get converted into sugar. So it's sort of self-defeating. You want to give your body enough protein, based on, again, sort of a - it's on the order of 0.6 to 1 gram per pound of body mass per day is about the right amount. And then, if anything is controversial, it's the idea that we make up the balance of those calories with fat because fat's been demonized for decades. And it does take, as I'm sure you've sensed, Leo, sort of a - there's some cognitive dissonance associated with looking around for fatty stuff.

Leo: Well, I think it's funny because we've both come to the same, somewhat, as you mentioned, somewhat same conclusion out of this. So to get back to the question, what the hell do you eat?

Steve: Well, I'm still, you know, this is new for me. So I'm still sort of working on figuring out what I want to eat. I had been, for a number of weeks, having, like, three or four eggs scrambled with ham, onions, and mushrooms mixed in, and then a Caesar salad. For a while I was eating...

Leo: For breakfast.

Steve: For breakfast, exactly. Because they want to give you fruit. And I eat out, so I have a choice of what's on the menu.

Leo: Right.

Steve: And the fruit is not, like, expensive blueberries and strawberries, it's inexpensive melons, big huge chunks of melons and things. And then they put, like, a token strawberry and a token raspberry in there, just to give it some color. But that costs more, so they're not giving you a lot of that. And then of course you have a choice of would you like sourdough or nine-grain wheat bread. And it's like, well, I don't want any of that. So I dispense with all of that and just do a Caesar salad, which is, again, I remember once upon a time I wouldn't do a Caesar because it had so many fat calories in it. Now that's what I want. I want calories from fat, and I also want the bulk of the salad and the array of nutrition in salad carbohydrate. And then in the evening I do a salad that has a much larger variety of vegetables in it - zucchini and more onions and tomato. And it's pretty much everything that I can get into a salad.

Leo: So what you're saying is Mom was right, eat more vegetables.

Steve: Yeah. Well, it's interesting, too, because one of the things you can do to enhance the whole ketogenic idea is to take a walk after a meal because, if some carbohydrates sneak into your meal, then you'd like to burn those off so that those are used up quickly. And so this whole notion of going for a walk after dinner, again, it's sort of folk wisdom which ends up actually being healthy for you. It does, by using your leg muscles, large muscles in your body, you're able to put a caloric drain on, and your body will always burn any glucose, any carbohydrate that it has received, preferentially. So that sort of gets it out of the way. And in fact I think it might have been Rosedale who did say in his Rosedale diet book that, if you end up having a meal that has some carbs in it, give yourself some exercise afterwards...

Leo: Yeah, it does say that.

Steve: ...to just sort of compensate for that. So one question that a lot of people had also was how do you know you're in ketosis, that is, the issue of measuring. And because it's a little complicated, and there's some problems with knowing, I wanted to touch on that, too.

I, of course, first detected it, as I said last week, because when I was urinating, there was a strong scent that was unusual that I detected for couple days. Now I understand that that's acetone that was in my blood as a consequence of fat being broken down. Anytime you are metabolizing - anytime our liver is metabolizing fat, it's breaking it into these ketones. And one of them is called acetoacetate, and a portion of it spontaneously breaks down into acetone, which we then expel. It comes out on our skin, and I'm still able to detect that on my skin. We also exhale it. And there has been some anecdotal reports of police breathalyzers false positivizing detecting alcohol, which is actually isopropanol, that people are exhaling.

And then one trick that I learned about when I was researching this, shortly after it began, was that Bayer makes a product called Ketostix, which allows you - it's a little sort of a dipstick that has a chemical on the end that is sensitive to one of the two ketones which survives in bulk in our blood and which then is also present in our urine. The problem is that it can be used initially to detect that, yes, indeed, you are in ketosis. But many adaptations occur after we've weaned ourselves from sugar.

Over the course of about a month there's a lot of adaptation occurring. Our muscles are initially burning both types of ketones that our liver is producing from fat, both the acetoacetate, and the second one is beta-hydroxybutyrate. However, our brain only wants the beta-hydroxybutyrate. Well, conveniently, after several weeks, enzymes that have been busily being built in our muscles as our body's adapting, this process of adaptation is essentially moving us from our typical diet which has so much carbohydrate in it that we're very rarely burning fat, certainly never in much quantity, over to a mode where we're deliberately not giving our body many carbohydrate calories. Instead we're giving it calories in the form of fat. And that's, for example, healthy oils, for example, omega-3 oils from fatty fish. An avocado is full of oil. And even an egg is, I think there's like a one-third/two-thirds protein and fat. I can't remember which way it is. But so there's a lot of protein there, and also a lot of fat.

So under the influence of this fat, our body is adapting. Our muscles are building, changing their enzyme balances in order to become better at oxidizing and burning fat. One of the things it does, our muscles do, is they start burning the acetoacetate into beta-hydroxybutyrate. That is, they switch over to only burning one of the ketones and producing as a product the other one. Well, the one they produce, conveniently, is the one our brain wants. Fortunately, the one they burn, this acetoacetate, is the one which decomposes into acetone, which we then are able to overtly detect, and it's the acetoacetate that the Ketostix detect.

So what will, guaranteed, will happen after about a month is you will stop being able to detect ketosis using these little Ketostix. So they're nice in the beginning, but no one should be discouraged, believing that they're no longer in ketosis, if they were once able to detect it and then they weren't. What that means is that your body has moved through this multi-week adaptation phase, and you're now more efficiently burning fat than you were before.

And then the final aspect of this is what are the benefits of this in the long term? That's the other question that I received a lot from last week is, okay, so we know that people

have been using this. As you said, Leo, there's lots of diets that have been based on low-carb of various compositions, but low carbohydrate is sort of the common factor to Atkins and the South Beach diet, the Zone diet, and a number of others.

One of the things that happens which stunned me was a complete loss of appetite, where I just - it was easy for me to decide to eat less and therefore really get a sense that I wasn't going to be fighting this battle to keep my weight down that I had been through my entire life. So for me, I like being in this state. My quest now is to work to understand it, to make sure it's healthy for me, to look for any contraindications. Someone did, from Finland, tweeted me about someone named Matt Stone who's very anti-paleo. And so I purchased his eBook and read enough of it to understand that he's a high meat paleo person. So it's like, okay, now, and then in that context I understood what it was that he was having problems with because I don't believe that's the right way to go. You only want enough protein to meet your body's needs, and you want to make up the difference in calories you've lost from carbohydrate by finding ways to add fat to your diet.

So one aspect is a real sense of ease with weight management. The other is exercise performance that I touched on last week. There have been a number of studies done comparing high-fat/low-carb to low-carb/high-fat diets, and also variations on protein. Almost without exception, the people have never used athletes that were fully adapted because it takes a month, typically, to get a month of being in ketosis - and that typically takes four or five days - but a month being there until your body has learned this new way, this new metabolism, which is really unlike the way we normally operate. And that just takes time for the enzyme percentages to shift so that we're able to function this way. When you do, you're tapping into a vast pool of body calories from your body's fat stores versus a much more limited pool of calories from your body's sugar stores. And good studies which have been done demonstrate tremendous exercise performance, endurance, and recovery from this.

And then beyond that, there are believed to be long-term health benefits. Fat, as I said, being a more reliable source of fuel because of this vast body pool that we have, studies that have been properly done with fat-adapted people, with fat-burning, keto-adapted people, show that there is a strong protein sparing effect. Your body does not want to take your muscle apart. In fact, it wants to build it. And so if you give it enough protein to do it without overeating protein, and then make up the balance of your daily caloric needs from fat, then you have no problem maintaining muscle mass.

I mentioned last week that burning fat only produces 70 percent of the carbon dioxide that burning sugar produces. So when you're exercising, your respiration is much easier or normal. And I discovered that, I mean, myself, just during that stair climber event two weeks after I first moved into ketosis. I was hugely surprised by how much easier it was to breathe. There are also studies that have shown over time you get a lowering of your thyroid and a slowing of your metabolism. Critics say, well, yes, that's a starvation response. Your body is trying to slow itself down because it's starving. But the fact is you're able to put yourself in caloric balance so that you're not losing weight. You're clearly not starving yourself.

And traditionally, slowed metabolism has been the enemy of people who were trying to lose weight because they felt like their body was working against them, consuming fewer calories while they were wishing it was consuming more calories. I love the idea of a slowed metabolism because metabolism is aging. It is the process of metabolism are the processes which, over time, represents the passage of time that is aging us. And so if that slows down, yet I still feel great, I'm functional, I'm alert, all of my blood chemistry says, wow, everything looks fine here, and there doesn't seem to be any other downside, then to me this looks like the right way to be.

Also, burning fat versus burning sugar produces measurably lower levels of what technically is called "reactive oxygen species," or more popularly known as "free radicals." There have been studies that have shown that there seem to be more highly unsaturated fatty acids which are part of the essential fatty acids that we need for health, seem to be more of them in keto-adapted athletes than in regular carbohydrate-burning athletes. Yet when the scientists looked to see if there were more being produced, because they knew they were able to make sure that they were on the same diet, it turns out that there were not more being produced, but it was that keto-adapted athletes were destroying them at a lower rate. So there ended up being more because carbohydrate-adapted people were producing more free radicals, which were destroying the highly unsaturated fatty acids, which are much more prone to oxidation than saturated fatty acids. So there was a more sensitive indicator of how much free radical production we're seeing.

And again, I mentioned that we do see, over and over and over, insulin resistance is improved, which is to say reduced. And blood pressure also normalizes. One of the things that our kidneys do when we are in a carbohydrate-consuming mode is they tend to retain sodium. And we've all heard how bad salt is, that salt raises your blood pressure and that in general we're over - that we, on a typical standard American diet, are generally consuming more sodium per day than we should.

One of the things that happens to people who switch into ketosis, there's something known as - it's often called the "Atkins Flu." It's a range of symptoms - headaches and, for example, diarrhea can occur and a number of 'flu-like symptoms where people don't feel very good for a while. It turns out that, almost without fail, that's because they have lost a lot of sodium and water because water is normally retained in order to help buffer the sodium. When your kidneys no longer retain sodium, it turns out that you get this spectrum of symptoms.

And so, again, the scientists that have really studied this understand that just replacing the sodium that you're now losing because your kidneys are no longer retaining it, almost immediately solves this problem. And, for example, Volek and Phinney, who wrote "The Art and Science of Low-Carbohydrate Living" and their second book, "The Art and Science of Low-Carbohydrate Performance," they suggest, if you like bouillon, just using a bouillon cube in hot water to give yourself a couple grams of sodium a day to replace what you're losing. It's no longer the case, in the same way that fat is not our enemy in this mode, neither is salt. And we need it, whereas traditionally we've been told not to overeat it.

But again, this is the kind of thing where I'm not a doctor. I'm repeating everything I've heard from research. So these are the kind of things you absolutely want to double-check with somebody who's got a degree in medicine, which is not me. And I would encourage you to do a lot of your own research, as well.

And I guess the last issue is, is this natural? This is a different way of functioning. I've come to appreciate that this is, I mean, this is radically different. This is, when this ketosis happened to me, I mean, the symptoms of it were surprising and shocking. Now I understand them all. And I'm looking at this as potentially the way I want to be for the rest of my life.

One of the things that I have seen in the feedback that I've received is people initially starting off very gung-ho. I mean, there are reports of people who have lost 50, 60, 70 pounds of body weight in this mode. But over time they felt resistance to it. It wasn't that it wasn't working for them, it's that there was pushback from their well-meaning but uninformed friends who were telling them, oh, what do you mean, bread's not good for you? Of course it is. It's the staff of life. And then there's just sort of societal pressure

because these agricultural-produced grains and starches are widespread, they're the bulk of what the supermarket has, and everybody else is eating them. So there's that kind of sort of social pressure.

And unless you really are diligent, what people were explaining in the feedback that I received is that the carbs just sort of crept back into their diet. Wasn't really deliberate, but they just sort of slid back over onto the wrong side of the sugar hill. And before they knew it, they were beginning to gain weight. So for me, everything I have seen says that it makes sense that this is the way our bodies were meant to function. And we know that just the fact that something makes sense doesn't mean it's true. It makes sense to Ansel Keys, who is the scientist and biologist and doctor who originally proposed that eating fat was causing heart disease.

Well, it really doesn't look like that's the case. There was a bunch of bad science that was done that drew that conclusion. It now really looks like eating carbohydrate is what raises triglycerides. And I did verify, at least for me, that when I cut out all of those carbs, I had the lowest level of triglycerides, which is blood fat, in my fat than I've ever had in my life, as opposed to last summer, when I was eating a lot of Chinese food and rice, and my triglycerides were higher than they've ever been.

Leo: Isn't that ironic.

Steve: It really is. It's just bizarre.

Leo: I think part of it, if you look at the obesity epidemic, there are lots of theses about why, and no one knows, of course, why it's happening. But Dr. Rosedale, among others, hypothesizes, maybe it's this anti-fat recommendation that we've all been adhering to over the last few decades. I mean everybody's said don't eat fat. Fat's bad for you.

Steve: Well, and all the food is advertised now as low-fat. And it's like, oh, this is good for you. It's lots of carbohydrate, but low fat.

Leo: If you could make a recommendation - and by the way, again, we'll do the disclaimer. Steve's not a physician or a dietician or a nutritionist. He's just an interested citizen who has a very scientific brain and is very good at synthesizing content and coming up with, I think, interesting conclusions. If you were to synthesize this as dietary recommendations, could you make it a simple - is there a simple set of things that people could at least attempt, maybe not being completely dogmatic about it, but something that might just help their health overall?

Steve: So, okay, again with the caveat that you really should, I mean, you must, before making any big changes, consult your physician. To get into ketosis, you need to be consuming - and there's a real broad consensus on this among the people who've looked at it - below about 50 grams of total carbohydrate per day, which is, because carbohydrate is four calories per gram, that's 200 calories from carbohydrate.

Now, my approach, because the sense I have is that carbohydrate is everywhere, is that I'm not deliberately eating any. But, for example, the soup that I eat has some potatoes in it, and they partially dissolve in the broth while it's sitting in the restaurant being cooked before it's served. I push the remaining solid potato out, but some is going to be

in there. So that's an example. I mean, there's just so much of this high starch and grain carb around, my sense is it's going to get into your diet. So I don't deliberately eat any.

You then need to eat about, as I mentioned, on the order of between maybe 0.6 to 1 gram of protein per pound. So you know how much you weigh. Multiply that maybe by, what, 0.75, sort of find something there in the middle. And then look at that in terms of how much protein is in eggs and how many eggs does that mean? How much protein is in various types of meat or fish? And so the idea is maybe a little bit of protein, like sort of the size of your fist is sort of a way to think of it as probably what's right.

And then, depending upon your goal, whether you're wanting to lose weight or you're wanting to maintain your weight, you make up the balance of calories from fat. And that can be avocado, if you enjoy avocado, and healthy oils that you're able to use. And butter is no longer the enemy, really, that it is long believed to be. Again, it takes some cognitive sort of retraining to think that way.

And then really do keep an eye on sodium because switching into this low-carb mode changes your salt requirements. I tried it, I started trying it on Friday. We're recording this on Sunday. So I've been experimenting with the bouillon for a couple days, and it really has helped me. Oddly, I've had a problem with tinnitus for many years, and I think maybe I've always been a little dehydrated because all I drink is coffee and Cabernet, both which tend to dehydrate us. And maybe I've never had the hydration that I should. I started drinking water with bouillon, and the ringing in my ears is gone. At this point it hasn't been gone that long because I haven't been doing it for that long. But I've never been able to figure out what the correlation was as it came and went. And it's not like this is a cure for tinnitus at all. Tinnitus is massively multifocal. All kinds of different things can cause some ringing in your ears. But for me, I just may have stumbled on another solution for myself.

Leo: Wow. 'Cause I have tinnitus. I'd love to get rid of it.

Steve: I know. It's annoying. And it comes and goes, and it may just be hydration. It may be the thing that I never considered. So by all means, if you're doing this, some bouillon is a good thing. But again, you don't want to be consuming too much salt unless you are in this mode where you need to be able to replace the sodium that your kidneys are no longer losing.

So my belief is, from everything I know at this point, this is the right way to be. There are pages at GRC that I will continue to work on: GRC.com/health. And I would imagine you and I, Leo, will talk about this again at some point in the future. Maybe six months from now we'll come back to it and sort of see where we both are.

Leo: Fascinating stuff. Before we run - we are going to go to TWiT in just a bit - these shows, both of them, are specials. This will be also on the TWiT Specials feed, and you can watch the two together to get a complete story, although there's a lot more online on Steve's site, GRC.com/health. Is "The Rosedale Diet" the book you would, if you were going to pick one book, recommend? Is there one book that you would suggest?

Steve: Boy, you know, anyone who's skeptical about this issue of agriculture and maybe the way we were meant to eat, I think "The Deadly Harvest" is a great read.

Leo: I like that book a lot, too, yeah.

Steve: Yeah. It's not fluffy. It's really full of really good information. But then anyone who wants an applied look, I think, yes, I think "The Rosedale Diet" book, Dr. Ron Rosedale, who's been helping people from a dietary, as in weight control standpoint, for several decades, I think that's best.

But then the real science book, which I hope you'll go to next, Leo, because I really recommend it, is by Volek and Phinney. These guys I mentioned last week. One of them is an MD from Stanford, then he did his nutritional biology PhD at MIT, got his degree there at MIT, then did post-doctoral work at Harvard. So, I mean, and then they both have PhDs. These guys have been studying this for several decades, and so they're "The Art and Science of Low-Carbohydrate Living," and then their second book, "The Art and Science of Low-Carbohydrate Performance," because of course there is all this mythology about carb-loading and protein-loading, all that, none of which really stands up against close scrutiny. And I've got links to all those books and short little reviews and summaries of them off of the GRC.com/health page.

Leo: GRC.com/health.

Steve: Oh, and I ought to just really mention quickly that, because some people have talked about trying to get into this, you definitely do not feel 100 percent for a few weeks. It's because your body is efficient at burning sugar and inefficient at burning fat, and you're denying it the fuel that it wants to burn and knows how to burn on purpose, sort of forcing it to switch over. Well, that...

Leo: You're retraining.

Steve: Yes, it's a retraining. And so there's, like, a valley. You're in the valley, not giving your body what it's used to getting, and it's not really able yet to metabolize what you are giving it. And everyone talks about how you come out of this, and you feel better than ever. I mean, really good. And so I can attest to the fact that there is that period. For me, the bouillon really did help. And that's generally the consensus of the people that have studied this.

But again, please, please, please don't hurt yourself. Absolutely talk - that would just be the worst ridiculous outcome. What's the point? So be careful. And even if your doctor doesn't agree with you, give him a chance to talk you out of it or to say, okay, fine, we'll just keep an eye on you.

Leo: I did, and my doctor said, "Sounds good. Go ahead. Go for it."

Steve: Good.

Leo: And I have metabolic syndrome. My blood pressure's been going up. My glucose level's been blowing up. I've got big fat tummy around the middle, all the things that doctors hate. So I think he's happy to see me do anything.

Steve: Well, and Leo, I think this is going to work for you, if you can slip into this mode. And so we'll check back.

Leo: Steve Gibson is at GRC.com, GRC.com/health. You can follow his tweets on the topic at @SGvlc, for Steve Gibson very low carb. Thanks, Steve.

Steve: Thanks, Leo.

Leo: All right. We'll talk more. In fact, we'll be back Wednesday with Security Now!. Hope you'll join us, 11:00 a.m. Pacific, 2:00 p.m. Eastern.

TWIT, I should say, is coming up next. John C. Dvorak is here and grumpy. You've made him grumpy. He said, "What happened to Steve?" What did you say? "He became a crackpot."

JOHN DVORAK: Yes.

Leo: Yes, John says, he's a crack - what happened? Steve used to be level-headed. I think this is good stuff, actually. I love it. Thanks, Steve.

Steve: Thanks, Leo.

Leo: See you. Bye.

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