



Transcript of “Everything You Need To Know About Saturated Fat & Cholesterol with Chris Masterjohn”

Bulletproof Radio podcast #16



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Dave: Today's cool fact of the day is about yawning. Yawning is actually an involuntary action that most humans do starting even in the womb. We've seen research that says fetuses as young as 11 weeks old start yawning. It turns out that contagious yawning doesn't happen until you're about age four. Even now, scientists haven't quite figured out why when one person yawns after someone else does, it seems to keep propagating to everyone else in the room. There are suggestions that it may be a sign of empathy that helps human beings bond with each other. That means in your next meeting, if you need to yawn, I guess you should.

You're listening to episode 16 of upgraded self radio with Dave from the Bulletproof executive blog. We have a great interview today with Dr. Chris Masterjohn. Chris is a really well known blogger, writer, and researcher in the health community. Mostly because of his critical thinking, because of his excellent articles, and his really kind of laid back, non-dogmatic approach to nutrition. I really respect Chris and what he has to say and what he has to write, and I'm really pleased to have him on the show.

He's going to talk with us today about one of the most common myths about health and disease, saturated fat. If you're one of those people who is still avoiding bulletproof coffee and our recommendations for butter and coconut oil because you're concerned about your health, you really want to listen to our conversation with Chris. He's a very rational guy and I think he's in line with the recommendations about saturated fat.

Co-host: Now we're going to move on to our exclusive interview with Chris Masterjohn from Cholesterol and health dot com.

Dave: He's the creator and maintainer of cholesterol-and-health.com, that's with dashes between all of the words. A website dedicated to extolling the virtues of cholesterol and cholesterol rich foods. By the way, you can see why we would have Chris on the show because not only do I read Chris's blog, I absolutely agree with him on these types of things.

He's authored three publications published in peer reviewed journals, including a letter to the Journal of the American College of Cardiology, criticizing the conclusions of a study on saturated fat. A letter in the American Heart Journal, arguing the safety trials of cholesterylester transfer protein inhibitors, and a vitamin E metabolism. And he's written a full length hypothesis paper that was publish in Medical Hypothesis about the molecular mechanism of vitamin B toxicity. He's also written a review on green tea and non-alcoholic fatty liver disease, which will be published soon in nutrition reviews. He's got a bachelor's degree in history, and is currently a doctoral student in nutritional sciences at the University of Connecticut.

He is going to be with us here on upgraded self radio today, to help dismantle some of the myths you probably believe about fats, and to provide you with some information that you need to pursue a healthy and more powerful lifestyle.

Chris, I'm super excited to have you here. Welcome.

Chris: Yeah. I'm excited to be here. Thank you so much Dave.

Dave: We're going to take maximum advantage of the time we've got with you on the interview today, so we're going to jump right in.

Chris: All right.

Dave: First question. Does saturated fat raise cholesterol levels?

Chris: Well, it depends on the context. There's pretty clear evidence by going back to the 1950's that if you substitute saturated fat for oils or fats rich in polyunsaturated fat, so for example if you substitute coconut oil or butter for oils such as corn oil, safflower oil and so on, that you'll increase cholesterol levels relative to those other oils. It becomes much less clear if you're trying to compare saturated fat to carbohydrate, such as fat monounsaturated fats, you're looking at much smaller differences and a little bit more complex differences. For example, saturated fat will tend to increase total cholesterol, but will increase HDL cholesterol as well as LDL cholesterol relative to carbohydrate. There's differences in particle size and other things like that.

It becomes even more complex when you're talking about a diet because if you're saying, "Okay, meat is high in saturated fat." Does eating meat raise your cholesterol or does eating any other types of foods that are rich in saturated fat? Very difficult to say because whenever you make dietary changes you're including a food that has a multitude of components in it besides saturated or unsaturated fat. You're also displacing other foods. Since different foods have different affects on satiety, you could be changing total caloric intake and so on and so forth. So, it would be incredible simplistic to say that saturated fat raises cholesterol levels, but there are certain context in which that statement is true.

Dave: I read an article by Stephan [Guyenet 00:05:02] a while ago about how a lot of saturated fat increases cholesterol over a short term but over the long term they normalize. Do you have anything to say about that?

Chris: Yeah. I've talked with Stephan about this a little bit and I think that we're pretty close to agreement with each other on this. If you substitute saturated fat for polyunsaturated fat in a very controlled setting, over the course of the long term the saturated fat will result in higher blood cholesterol levels than the polyunsaturated fat. In the case of ... Nothing's posted about observational studies. This is, of course, looking at a more realistic scenario where people are not in such a controlled setting and they're choosing natural foods and they're doing so over the long term, but it's also in a setting that is much more confounded by all those variables that I was just talking about.

These people aren't choosing to drink a milkshake that's had its fat replaced with corn oil or something like that, that you might see in a laboratory setting. They're choosing foods like coconut or meat or junk foods rich in saturated fat, natural foods rich in saturated fat, and you have so many other interacting factors. I don't think that those studies ... What he showed was that in these observational studies, there's no evidence that people who have higher saturated fat intake have higher blood cholesterol levels.

I don't think that's just because it's over the long term, I think it's also because there are so many other variables that enter into play when

you're in a natural situation. When you're in a highly controlled laboratory situation, things are different and you can isolate those other variables out and show that if you substitute animal fat for vegetable oils and you keep everything the same, then you do see that change even over the long term.

The best demonstration of that is the LA Veterans Administration Hospital study where they took about 850 men who are inpatients in a veterans residence home and they randomly allocated them to one of two dining halls. The two dining halls, over the course of eight years, fed everyone the exact same food, but in one they used animal fat in the cooking and in the other they used a mix of vegetable oils in the cooking. Even over the course of those eight years, the differences in blood cholesterol levels were sustained over very long periods of time.

The question is, is that finding relevant? Well, it's not relevant to the point where you can say that any diet that's rich in saturated fats from natural sources is going to lead to higher blood cholesterol levels than some other diet that's rich in vegetable oils. That's not true and that's what Stephan's post showed, that people who eat diets high in saturated fat do not necessarily have higher blood cholesterol levels than other people.

Dave: Let's say that cholesterol, that saturated fat does raise cholesterol, does that equal heart disease?

Chris: No, it doesn't because cholesterol doesn't cause heart disease. If you want the clear evidence for this, we can go back to the cholesterol fed rabbit model, which is the model that everyone wants to go back to when they're trying to prove that cholesterol does cause heart disease. If we actually go back to that model, which was really the beginning of this idea that cholesterol causes heart disease. The clear demonstration that this idea is false is that if you injected these rabbits with tons of cholesterol, they wouldn't develop any atherosclerosis, so, from the get go, when we were trying to look at this idea about the role of cholesterol and heart disease, we see that it's much more complex than simply having cholesterol accumulating in the blood and creating a plaque.

What we have is a disease that's caused by the oxidative degeneration of lipids in the blood. We should be less focused on controlling the amount of lipid in the blood, and more focused on preventing the inflammation and oxidative stress that leads to the degradation of vulnerable lipids in the blood.

It's this type of oxidative destruction and inflammation that actually causing you plaque. Saturated fat, in a very highly controlled setting, can raise blood cholesterol levels, but we don't necessarily care about that. We care about whether blood cholesterol levels ... excuse me. We care about whether saturated fat or some other type of food is actually going to cause heart disease. The evidence for that is incredibly poor. In fact, there's plenty of evidence to refute it. In the few trials that have been done over the long term, looking at whether substituting vegetable oils for traditional animal fats can prevent heart disease, those trials miserably failed to provide any evidence that in fact vegetable oils could protect against heart disease. What they showed instead was that vegetable oils might actually cause heart disease and almost certainly cause cancer when they're substituted for traditional animal fats.

I think if we look at the evidence we see that saturated fat does have the potential to raise blood cholesterol levels, but it probably protects against heart disease and more, even more clearly, probably protects against cancer.

Dave: I love hearing this. I've come to the same conclusions. That's one of the reasons that there's high saturated fat in the bulletproof diet which is something that we talk on the site a lot, about how eating saturated fat from clean sources is unlikely to cause problems. There's a confounding factor here that I don't see addressed in any of these studies. I'm wondering if you've come across it. That is the role of mycotoxins, even at parts per million concentrations, in food. These are things that come from, basically fungal contamination of feed that animals eat, that bioaccumulate.

I've got a whole lecture that I gave on cardiovascular problems and the evidence of their link to mycotoxins in small amounts in food or the environment around us. Even though we couldn't measure mycotoxins

till 1985, how do we know if any of these studies before then, or any of the studies that didn't control for them were using contaminated animal fat from animals that were rendered improperly, stored improperly, or fed improperly, and, is that a [compounding 00:11:55] variable we should think about?

Chris: Yeah. I think that it's entirely plausible that mycotoxins and many other sources of information are going to contribute to heart disease. If you're not measuring the mycotoxins, and quite certainly you can't control for them, but that could be true of a million other things that we could say ... There are many there things that we [inaudible 00:12:28] identify as potential causes of heart disease that these studies probably didn't control for.

Dave: Yes.

Chris: I don't think you can levy that as a criticism against the investigators. I think at least some of these studies were done pretty well, in terms of with the knowledge base at the time was, and the intent of the study, which was simply to say, "Okay, can we support this recommendation for people to go out to the grocery store and buy this oil instead of that oil."

I think some of these studies were pretty badly done, but some of them are done pretty well in terms of trying to address that specific question. I think what you're highlighting is that there is always a great amount of uncertainty when we're doing scientific studies because even if you show that something happened in the laboratory as a cause and effect phenomenon, that doesn't necessarily mean that that thing is happening outside the laboratory.

I think what you have to do is try to look at the totality of the evidence and synthesize it in some way, but you really need something to fall back on and you can't just rely on these clinical trials because you're always going to be able to find things that they didn't control for. If you think about it, the vast amount of truth probably falls into three categories, things we haven't thought of yet, things that we thought of and we can't test, and things that we can't even imagine. Some of the

things fall into this tiny portion of currently investigated controversial issues. Mycotoxins probably falls into that category.

The other three categories are much larger than that. Whenever we make a decision to act on something and choose something to eat, we can't just rely on clinical trials. We could be doing clinical trials for 1000s of years and probably still wouldn't have all the answers. In my view, what we want to fall back on is some kind of framework for interpreting the uncertainty. I think one of those things is to look at what has the greatest track record of success in human populations. What kind of diets did people eat before we came up with all of these theories about what causes heart disease and can we look towards some of these populations that were well studied to be free of heart disease.

We have a number of those, the Kitavans are a currently fashionable example to look to. These are Pacific islanders who were studied very extensively and shown to be free of heart disease. Same thing with the Maasai, a cattle herding tribe in Kenya and Tanzania. What we see in these groups is that they ate saturated fats. The Kitavans, the Kitavans eat a very low fat diet, but it's all coconut. They're consuming 50% more saturated fat than Americans are and they don't have any heart disease. The Maasai are eating plenty of animal fat, either from meat or from butter fat, which is very saturated. They were shown to not have any heart disease either.

I think we need to fall back on those things and say, "We don't have all of the answers yet from clinical evidence, but if these kinds of diets rich in traditional animal fats and traditional tropical oils are associated with freedom from heart disease at the population level, then if these are the kinds of fats and oils that humans have been eating throughout our existence until the 20th century, maybe those are safer bets when we don't have all the answers." That's the way that I view it.

Dave: Very very well put in that you have to look at the balance of evidence and then you have to look at what you can implement and what just makes sense. Then you need to test on your own self, how are you doing, which is another part of, certainly what I recommend, is okay then try it and see what happens over time to your own blood

chemistry. If you make a big change and it looks like you're going to die, well then, maybe you should undo that change.

One of the big concerns that people bring up when they see me recommend that they put tablespoons of grass fed butter in their coffee to make bulletproof coffee, is that saturated fat makes your platelets more likely to be sticky or more likely to clot. I know lots of other things that make platelets sticky. I haven't seen a lot about saturated fat doing that. What's your take? Does saturated fat make you more clotty or less clotty?

Chris: I have looked for evidence about that and not found any. I would have to look at the references that people are citing for this claim. I'm not aware of evidence that eating saturated fat is necessarily going to make your blood clot.

Dave: I haven't found it either. In fact, I was once diagnosed with extremely high levels of thrombin when I was in my late 20s, actually, when I weighed 300 pounds. Now that I'm on my high saturated fat diet I don't have that problem. I'm not saying that that's causative at all, but I do know, for instance, many different toxins will cause your platelets to be stick and even some other lifestyle things like exercise and oxygen levels.

You're one of the guys whose done an enormous amount of research here, more than I have on this stuff, and you haven't found it either. For people who say that, I think the right answer is can you cite references because I don't know of the evidence of that. It sounds like you don't either.

Chris: Well, at the end of the day I think it's sort of a silly argument anyway. Like we said before, there have been long term controlled trials looking at actual heart endpoints like heart disease over a long period of time, substituting saturated fats for vegetable oils. Those trials do not support at all, and seem to at least somewhat contradict the idea that saturated fat causes heart disease. To take an intermediate variable like blood clotting or cholesterol levels or something like and say, "Well, X causes

Y, and Y causes Z, therefore X must cause Z." I think is a very wrong way to look at it.

If the evidence at least strongly suggests saturated fat doesn't cause heart disease, then no matter what you find for intermediate variables, it just doesn't make any sense to argue that it does cause heart disease. Especially when whatever studies might look at this are invariably going to be very short term studies that are much less comprehensive in scope than the studies that have already been done.

I think, sometimes Dave, there's a bias that enters into this that you want to look at the most recent evidence, but the last long term properly controlled trials were done, the last one was published in the 1980s and the most comprehensive one, the LA Veterans Administration Hospital Study is published in 1969. You don't want to look at the most recent evidence, you want to look at the best evidence. Until someone has a better, more comprehensive, better controlled, longer term trial, than those trials that have already been done, looking at real endpoints like heart disease incidents or heart disease mortality, then I don't think it makes sense to try to compile all the minutia of things published recently of much lower quality to try to blame saturated fat on everything from heart disease to cancer to why your mother doesn't call you anymore, or something like that.

Dave: That's actually a perfect segue to our next question and another one of the things that people say about saturated fat and another recommendation as to why you should eat less or not eat it, is that it causes cancer. You had an excellent post in your blog talking about some of the confounding factors about that and about a study that "showed" that high saturated fat intake caused liver cancer. Could you talk about that? Does saturated fat actually cause cancer?

Chris: Well, once again, if we go back to the LA Veterans Administration Hospital Study, this was a study ... Out of all of the vegetable oil substitution studies that have been done, this is the most valuable one for looking at cancer because it's the only one where the age group was high enough, old enough, to actually see a significant incidence of cancer. What they showed in this study was that for the first two years

of the trials, there was no difference in the incidence of cancer between people consuming traditional animal fats and people consuming vegetable oils, but after two years the incidents started to separate. People consuming the vegetable oils had a greater incidence of cancer than those consuming the traditional animal fats. Once you got beyond five years, the difference became even wider.

It appears that the longer the trial goes on, the more likely we are to see an increase risk of cancer when we substitute vegetable oils for these traditional animal fats. I think that there's pretty strong evidence that traditional animal fats are protective against cancer.

Dave: Are they protective against heart disease also?

Chris: That's a little bit more difficult to tease out. If we look at the ... For people who are interested in my take on this in more detail, I gave a whole lecture that focused on this at the last Wise Traditions. The annual conference of the Weston Price Foundation, November. You can order that online.

There were six trials that were done substituting vegetable oils for traditional animal fats in a single factor trial, meaning that's the only thing that they changed, it's not confounded by other changes, and in a properly controlled randomized setting. Two of those trials showed an increased risk of heart disease with vegetable oils. One of them showed no difference. One of them was abandoned halfway through the study and they merged the saturated fat and unsaturated fat groups together to try to show that when they were merged together they were both healthier than people who hadn't been part of the study. They never gave us the answers about what actually happened to heart disease, mortality, and total mortality over the course of the study.

Then two of them were double blind. One was the Minnesota coronary survey and the average length of time was only a year for any given subject in that study. They showed no difference. Although, the trend seemed to favor an increased risk of heart disease with the vegetable oil group, but it wasn't statistically significant.

The final one was the LA Veterans Administration Hospital Study we've been talking about. That study was conducted for a little bit over eight years. Most of the people in the study were probably on the diets for about six years or so. What we see there was when we look at the study superficially, we do see a decreased risk of heart disease with the vegetable oils, but an increased risk of all cause mortality, including cancer, such that there was no difference in total mortality.

That seems at first glance to suggest that the vegetable oils are shifting disease risk away from heart disease and towards cancer and other diseases, but it turns out that there were a number of confounders. The first was that the control group, meaning the group eating the animal fats, had twice as many heavy smokers and 60% more moderate smokers. The treatment group, meaning the vegetable group, had an increase in light smokers and non-smokers. So they see that smoking was heavily shifted in ... I'm sorry, the animal fat group had a much higher incidence of smoking, heavy smoking and moderate smoking. That we would expect to contribute to heart disease and the cancer. We can say that we're not quite sure whether it was the smoking or the animal fats that were contributing to the increase risk of heart disease, but we can also say that the animal fats seem to be protecting the smokers from getting cancer.

The bigger issue was they didn't go into detail what type of fats they were using. We know they used butter, but we don't know what other fats that were using. The animal fat diet was very deficient in vitamin E compared to what we would expect from a mix of traditional animal fats. It's difficult to speculate why because they don't give enough details about the diet. We would also expect the vitamin E deficiency to contribute to heart disease, and I would think also, to contribute to cancer.

When we analyze that trial alone, we see the heart disease is somewhat confounded. When we analyze it with the other five trials that were done, I think the fair thing to say is that vegetable oils do not seem to protect against heart disease. They may increase the risk of heart disease as was shown in at least two of those trials, but I would be

careful of making that conclusion so cleanly because of the conflicting evidence.

I would say that the traditional animal fats do seem to be protective against smoking and vitamin E deficiency when it comes to cancer. I think that conclusion is much clearer. At the end of the day, the evidence just is not there to say that vegetable oils protect against heart disease because of those confounders in the LA Veterans Administration Study and because vegetable oils increased heart disease risk in other studies that didn't have those specific confounders.

I think the answer is unclear, but it certainly would tend towards being not a good picture for the vegetable oils. I quoted this in my Wise Traditions talk, I'll quote it again, I think Broda Barnes, the late endocrinologist probably said it best in the 1970s, in his book, Solve the Riddle of Heart Attacks, when he said that everyone should be free to play Russian Roulette with their health, but in the case of the polyunsaturated fats, it's only fair to give them the warning that the gun probably contains live ammunition. I think that's [inaudible 00:28:18] put it.

Dave: That is a wonderful quote and one I haven't heard. I love that. I hear lots of people who come to the blog and they say, "You know, Canola oil has to be good. It's Omega 3" and there's lots of reasons to say come on, look at the research, but what about things like olive oil. Do you recommend or based on your research, do you believe that there's a certain amount of fat that should come from saturated versus unsaturated in an ideal diet?

Chris: Well, I think that if you look at the needs of a mammal, it seems to favor a mix of saturated and unsaturated fats. If you look at any of the animal fats, particularly if you look at ruminants. Ruminants are interesting because, red meat fats, because the animal is less vulnerable to fluctuation in dietary fats. I think it's more reflective of the animal's needs. You clearly see plenty of monounsaturated fat. If you eat beef fat, for example, suet or tallow, you're getting a pretty good mix of saturated and monounsaturated fat. Even a slight favoring of monounsaturated fat. I think the same is true if you had humans on a very low fat diet, our

bodies would synthesize fat from carbohydrate and then make a mix of monounsaturated and saturated fats.

I think if the type of fat you eat matters, then I think if you are eating a lot of fat, it's probably safest to eat fats that are going to give you a mixture of saturated and monounsaturated fats and a fairly low polyunsaturated fatty acid intake because that is what best reflects the needs of a mammal for the different fatty acids.

You do have population that eat an extraordinary amount of coconut and seem to do quite well. Like on [inaudible 00:30:17] which is another Pacific Island, they're consuming about half their calories from saturated fat. They're not consuming a lot of monounsaturated fat and they seem to be very health. I wouldn't be too dogmatic about the need for monounsaturated fat, but certainly olive oil is a traditional oil in the Mediterranean, and I think that because of its polyunsaturated fatty acid content, I wouldn't want to eat a diet that was 60% olive oil, but I think to use it in moderation is fine.

Dave: What's your take on cooking olive oil?

Chris: Well, the less you cook oils the better. I think cooking olive oil if it's moderate or light cooking, I think it is going to be okay, but I wouldn't subject it to high heat. I think the less cooked oil you eat probably the better, that's my general take.

Dave: That's definitely how we position it on the bulletproof diet is that if it's mono or especially polyunsaturated, try to heat it as little as possible. If you're going to cook, go with the more saturated fats, just because eating oxidized polyunsaturated fats probably isn't a good idea for cancer or [crosstalk 00:31:32].

Chris: Yeah, well, saturated fats can oxidize at really high temperatures too, so it's not ... I don't want to give people the idea that just because a fat is predominately saturated you can subject it to deep frying temperatures and get away with it. I agree, if you're going to use it for cooking, more saturated the better.

There's other considerations too, like compounds besides the fats that can lead to smoking and so on. If you choose oils and fats that have a high smoke point and are low in polyunsaturated fats, relatively rich in saturated fat, I think those are the best for cooking. Again, I think that you want to ... I think that it's best if you emphasize raw, steamed, simmered food in the diet and if you're frying things in a pan with oil, I think that's fine, but it should be a minority of a diet, not your ... It shouldn't constitute 70 or 80% of your food intake.

Dave: I definitely think you're on the right track there. Most of what I eat is not cooked in fat. I cook it in a little bit of water or some steam and then I add the fat when I'm done. Even french fries that I would make in the oven are broiled and then they might soak in some melted butter and they taste great. They weren't fried in it because it has a different affect on the way you feel.

Chris: Yeah. I tend to do things like that too. I might make a soup, for example, and I find that I need a certain amount in my diet just to stay full and satisfied. If I make a soup, I might add the oil at the end. Then I get enough, I get the amount of fat that I need, but I'm not subjecting it too much heat. It sounds pretty similar to what you do.

Dave: Very much, in fact, my favorite soup on earth is just steamed vegetables, tossed in a blender with half a stick of butter and some salt. It's a tough life but I can eat that.

Chris: Yep.

Dave: Now, you mentioned soup and this is a question where ... One of the areas where I've done extensive biohacking, lost 100 pounds and done years of research with, in fact, the Silicon Valley Health Institute is a non-profit. I've been on the board as the chairman for several years. We bring a lot of researchers in. The stuff you're saying to me is music to my ears because we've heard different points that you've made from different people. Some of whom were considered crazy and some of whom were very mainstream. One area that I'm a little bit ... that I have a question about is on the wisdom of making bone broth. I know about Weston A. Price. I'm a huge fan of Healthy Traditions and all that, but if

you're [inaudible 00:34:16] polyunsaturated fatty acids, which is bone marrow, and collagen proteins which get denatured when you heat them and you're doing it for long periods of time, aren't you creating an inflammatory mix?

Chris: Well, gelatin is denatured collagen and it's ... All of the properties of gelatin are dependent on the DNA chain of collagen. I think gelatin has an anti-inflammatory reputation for a pretty good reason. I'd be more concerned about the fat and in fact, I tend to skim the fat off of my broth when I use it. I suppose you could judge by the smell. If it doesn't smell rancid it's probably okay to use, but I agree with you that you probably don't want to be using that fat when it's been cooked for a day as a staple fat.

Dave: Interesting. Okay. I think that would address one of my big concerns about making a bone broth soup. The formation of glutamate from just long time cooking there, are you familiar with glutamate formations from proteins that are denatured for long periods of time? Is that an area where you've read or is that outside your domain of expertise?

Chris: I would say it's outside my domain of expertise. I've read of people who are very sensitive to glutamate who can't tolerate bone broth for that reason. I once had a discussion with someone about this person's boyfriend was extremely sensitive to glutamate and would have seizures in response to fermented foods and bone broths. I think that's way in the tails of the distribution of peoples tolerance for glutamate and is only relevant to people who have very extreme sensitives.

Dave: Got it. Now, in terms of getting collagen, what I use is a low temperature, grass fed, type 2 hydrolyzed collagen, that hasn't been heated. I noticed a difference in how I feel with that versus using the gelatin which is fully denatured. I'm also, though, using one that's a low peptide side, so it's very absorbable. Have you seen any research on differences in types of collagen in food? Or is that also far from the fat area where you tend to focus?

Chris: Yeah. That's pretty much way outside my area.

Dave: Okay. Cool.

Chris: [Crosstalk 00:36:49].

Dave: I'm like really interested in it.

Chris: [Crosstalk 00:36:50] hear about your experience.

Dave: I'm very interested in the ultimate collagen out there and I've got the best one I've been able to find, but I'm always thinking, is there a way I can make it myself even better? I think, we'll have to table that one.

Chris: I think for the typical family, making bone broth is probably the most economic and convenient way to get collagen into their diets.

Dave: More than just ...

Chris: There may be ways to improve that like you're disusing, but it's a pretty inexpensive and convenient thing to be able to throw a bunch of bones in the slow cooker, crock pot and just harvest stock whenever you have time to.

Dave: That's a very fair point. We've talked a lot about avoiding cancer, avoiding heart disease and things like that. A big part of the bulletproof stuff that I do has, first, I regenerate my health and recovered from a lot of really tough things, but there's also a big focus on cognitive performance, physical performance, and for lack of a better word, just kicking more ass. In terms of the nutritional recommendations and the research that you've seen, are there any recommendations that stand out as making people have better memories, better mental performance, more energy, or more endurance?

Chris: Sure. There are probably lots of things that do that. One of my interests that I've written a lot about is choline. I wrote a lot of posts on my blog about choline at the end of last year with respect to fatty liver disease. Choline, of course, is also very important to the brain. It's found most abundantly in liver and [inaudible 00:38:46]. There are some rat experiments where they found that if you give choline, this especially applies to pregnant women and women who are [crosstalk 00:38:57] ...

Dave: Yes.

Chris: ... for the first few years of life. If you give rats at the corresponding periods of development choline that's three times their apparent requirement, they have a huge boosts in memory and mental performance of all types. It eliminates their age related decline in memory. The age related decline in memory is something that we're all familiar with. If we're not old yet, we know other people in our lives whose memories decline as they get older. It's sort of a typical feature of life, whenever you start forgetting stuff, you thinking you must be getting older. If that, in fact, is preventable by supplying sufficient choline during pregnancy and lactation, I think that's something pretty huge that we want to take advantage of.

The liver, of course, is rich in so many other things that are likely to boost mental performance and physical performance, including all of the B vitamins and folic acid and carnitine and all these different things. I think liver, it's certainly my experience that I definitely feel better when I eat liver. I definitely feel like it boosts my mental and physical performance. I think that's probably the most overlooked food in the typical modern diet that could be used to boost function of all kinds.

Dave: There's definitely good research on liver, to the point that, being I did to raw diets for awhile. I'm still not opposed to them. I once did a raw lamb liver smoothie. I'm the kind of guy who will eat anything if I think it's going to make me perform better or feel better. I have to tell you, that was the most horrible thing I've ever done in my entire life. Is there a way to make liver taste good and still healthy?

Chris: Well, if you can reverse engineer Takashi's raw liver recipes. Takashi's is a restaurant in East Village in New York City. They serve a raw liver dish there, and I'll tell you that their raw liver dish is better than any liver that I've ever made cooked or raw. If you can visit their restaurant and try to reconstruct their recipe and reverse engineer it, I think that you've probably found something roughly equivalent to the fountain of eternal life. Certainly if you can make it yourself, it's going to be a lot more affordable than eating it there. I know it involves marinating it in sesame oil and I think lime, but I don't know the details of the

proportions or whether anything else is done to it. When I have sometime I'm going to try to reverse engineer it myself, but we'll see.

Dave: Wow. I think we should have dinner there and we'll just bring along a masspectrometer, it will be easy.

Chris: Yeah. There you go.

Dave: Thanks for that pointer. I'm sure other people who are listening to the podcast might [inaudible 00:42:18] deliver. In terms of eggs, by the way, our book recommends multiple, multiple raw egg yolks during, and even before pregnancy. My wife, who's a [inaudible 00:42:30] trained position, I used to make ice cream for her with eight or nine egg yolks in it that we'd eat at night when she was pregnant and when we were working to conceive. I think that there's pretty good evidence behind that, enough that we made it part of our planning.

Chris: Egg yolks and liver are also really high in biotin and when you're at the pre-conception point, I think that it's advisable for that reason too to eat a lot of egg yolks because biotin requirements ... There's pretty decent evidence that biotin requirements increase during pregnancy and that repleting biotin might be able to prevent birth defects.

I had written an article on pregnancy nutrition back a few years ago for the Weston A. Price Foundation. That was one of the things I recommended was increasing more egg yolks. Certainly more palatable way to do that is to make some ice cream and throw some raw egg yolks in the ice cream. I think most pregnant women would probably enjoy that.

Dave: I have the recipe. I think it's up now. If not, it should be up shortly. I actually called it Get Some Now Ice cream. Even if there's no pregnancy involved, I think there's some signaling that happens when the body gets enough of those nutrients, it actually has effects that say, "Well, it's time to reproduce." You can just feel a difference. More than one person who's tried the [inaudible 00:43:51] for ice cream has said that an hour after this came, it's a very successful date, and it's repeatable. Life can be worse. We'll just put it that way.

- Chris: There's something endearing about making ice cream for someone that might help with that too.
- Dave: Oh yeah. I think that that's a part of the whole thing.
- Co-host: Bulletproof coffee is something that Dave created that's gotten really popular. Basically you take very low toxin high performance coffee that we have now on the site, and you mix it with 50 grams of grass fed butter and some MCT oil in it. A lot of people, we just talked about saturated fatty good bits, still avoid full fat dairy. They'll say maybe they don't think saturated fat is bad for you, but for some reason they want to just eat less. They choose skim milk and all these low fat dairy products. Is there any reason that might be bad for you besides the fact that they're just depriving themselves of the nutrients in saturated fat? I've heard that the presence of betacellulin and some other compounds in milk and dairy products, when it's removed from natural fats like CLA and other compounds might be a bad idea.
- Chris: That's possible, and I've written about that before, about the betacellulin issue. I think that it's ... You have to realize that when you're speculating based on either mechanism or some molecules in the food, then you're really off into speculation land. What you're saying might be true and it might be completely false. I think it's important to speculate, but to realize that what we're doing is speculating. I think that Dave's point earlier about self-experimentation comes in here. I think it's important not to fear the saturated fat, but it's also important to look at your own experience and how your body's responding to these things. Some people just at least report doing better on diets that are lower in fat, and other people report doing better in diets that are higher in fat.
- I tend, unless I have some compelling reason not to, to take people's reports about their own experience seriously. I think if someone consistently finds that if they eat less dairy fat, they do better in terms of their weight, their physique, their energy, then I think it's fine for them to avoid eating too much dairy fat. I certainly wouldn't be afraid of it and I would certainly want people to be aware of the potential benefits of dairy fat. I think those are very real.

I'm somewhat open minded about it. I'm not going to tell people you can't ever remove the butter from your dairy product or eliminate the butter or cream from your coffee, but at the same time, I think it's important to recognize that the potential health promoting effects of those foods do exist.

Co-host: I think that's an excellent way to put it. One of the other areas of my interest and I, something most feel should be a little bit concerned about, is how much polyunsaturated fat we actually need. We talked a little bit about how excess polyunsaturated fats may even increase your risk of things like cancer and heart disease, and so it seems like a good idea to try and just basically get what we need and really not much more. There's some kind of debate about what polyunsaturated fats we actually need, how much we need, and I was hoping you could kind of clear that up for us.

Chris: Sure. A few years ago I did a lot of research into this and I published a report on my website called How Essential are the Essential Fatty Acids? This is the proof of report part one. There is a sequel coming out. It's taking a long time to write it. The first part of that, and some of these findings were summarized in an article that I wrote for Wise Traditions, for the Weston A. Price Foundation, called Precious Yet Perilous. My basic conclusions about the requirements for polyunsaturated fatty acids are that first of all, requirement is infinitesimal for adults who are healthy and who are not women who are planning to conceive, who are pregnant, or who are lactating.

The requirement for these fatty acids ... When I say infinitesimal, if you tried to eat an essential fatty acid deficient diet, you probably wouldn't be able to. The requirement for these fatty acids really kicks in during several circumstances or life stages. The first is growth and development, all throughout infancy and childhood. The second is a woman who is planning to become pregnant, is pregnant, or is lactating, or recovering from pregnancy and lactation. Basically, woman throughout most of their child bearing years, if they're planning on bearing children, through that period are going to need more essential fatty acids. The third is any other category of growth, whether at the most microscopic or tissue level or the whole organismal level.

What I mean is if someone's recovering from an injury, you got cut and you need to heal your wound, that is a form of growth. You might not be getting any bigger, but you need to repair that wound and that involves tissue growth. On the other side of the spectrum, you might have a body builder who is working out for the specific purpose of gaining muscle mass. That person's not healing from an injury in the same way that the person healing from the wound is, but they are getting bigger and they are creating more tissue all over the place, especially in the skeletal muscle. Then the last type might be during a degenerative disease where, and this is true of most degenerative diseases, where you have oxidated destruction of these vulnerable essential fatty acids within your body and you need to replace them. You might not be synthesizing new tissue, but you need to be constantly refilling what's being depleted from the tissues that you already have.

In those cases, the requirement for essential fatty acids becomes active. It is still very low. The animal experiments suggest that it is far less than 1% of our calories.

I say animal experiments, there are some data from humans, just very little. The requirement is probably far less than 1% of our calories, especially for consuming the essential fatty acids within a context of a diet that is rich in vitamins and minerals, especially vitamin B6, magnesium, but nutrient dense in general, and is low in refined sugars, heated vegetable oils, and other things that are going to promote oxidative stress.

In that ideal dietary context, the requirement is so low that I think all you need to do is eat some traditional animal foods, fish, cod liver oil, are excellent Omega3 sources. Egg yolks and liver are excellent Omega6 sources. If the animals are raised on pasture, then even egg yolks and liver, especially egg yolks, can also become a decent source of Omega3s, but really, any of these animal foods should be sufficient for most people. We don't know how much the requirement increases during pregnancy exactly. I think it's a good idea to eat pretty liberally of things like egg yolks and seafood during pregnancy because of all those other nutrients that are coming in with those foods anyway. Even if you don't need to eat several egg yolks everyday for your essential fatty acid

requirement during pregnancy, you might still be benefiting from getting the biotin. You might still be benefiting from getting selenium and iodine and other things from seafood.

Then of course, finally, if there are people who have genetic polymorphisms that decrease their ability to synthesize essential fatty acids from plant oils, then for those people, during these life stages where the requirement increases, maybe they might need more than other people. I think it's trial and error. If you have symptoms of essential fatty acid deficiency and you think you're consuming enough, try eating more. Maybe there's a specific reason that you need more. For most people, especially adults who aren't going through these stages of growth and repair, the requirement is so small that I think all you need to do is include some traditional animal foods in your diet and you should, theoretically, be all set.

Dave: I think that's really well put. The research that we did for the better baby book had us decide to recommend DHA supplementation for kids under seven and during pregnancy simply because, until you turn about seven when you're a child, your body isn't really capable of synthesizing DHA. Apparently it can make EPA, but the DHA pathways aren't mature enough.

There, you can get DHA from the diet, and certainly we eat a lot of smoked salmon and things like that with my kids, as well as raw egg yolks and various other things. I'm with you though. I question the value of fish oil supplementation and I actually take Krill oil myself because I think that having some of the EPA phosphorylated is probably worth doing, but it's a relatively small amount and it comes with [inaudible 00:54:30] which is pretty good.

Chris: Yeah, I think the evidence is pretty, somewhat speculative. I'm not going to say everyone needs to eat Krill oil, but if you have, especially if you're trying to target those fatty acids of the brain, then if you can get them in phospholipid form like they are in Krill oil, there's pretty decent evidence suggesting that that would increase their bioavailability, especially the nervous system.

Dave: Right, it's one of those things. It's certainly not definitive, it's just sort of the best guess we have. I seem to feel better when I do it. Who knows, maybe placebo, but, there's still value in the placebo thing. The Krill won't mind. I have two more questions for you before we wrap up the show today. The first one is what about tests for oxidized LDL. Are they accurate? Are they good? Should people be paying attention to that or should they just not worry about it all together?

Chris: I think the tests for oxidized LDL are mostly at research level at this point. There are studies that show that people who have higher oxidized LDL in their plasma, using certain assays, have higher risks for heart disease. You would think if the test was not measuring anything meaningful that they wouldn't find those associations. I think those tests probably carry some meaning, but I think that we're far from the point where I would actually want to recommend people go out and get oxidized LDL tested. There are a few reasons for this.

First of all, I'm not exactly sure what's available to the consumers through the doctor's office, but most of the assays for oxidized LDL out there are amino assays, meaning they're antibody based assays. I think there are a lot of questions I would have about exactly what they're detecting and I really question their ability to fully characterize the type of oxidation that's present in plasma. I think what you would ideally want to do is ... If you really want to look at the oxidation of LDL particles in the plasma, you want to be able to take the LDL particles and separate their constituents and actually quantify all of the specific different types of oxidized components. You definitely can't do that with the current assays being used.

Then there's another question which is does the presence of oxidized LDL in plasma, is that a good marker for the amount of oxidation actually going on? That's very difficult to tease out at this point because once LDL oxidizes in plasma, it pretty quickly is cleared from plasma. There are a lot of, I think, questions that would remain about interpreting those tests, and there isn't a good pool of data from perspective studies showing that these assays can be used in a consistent manner to add information, your cardiovascular disease risk,

beyond what people are already testing for. Until we get to that point, I am not going to recommend that people start getting these tests.

Dave: I can tell you that I don't regularly track mine. I did because I've been tracking changes for about almost 10 years now, using a whole bunch of anti-aging profiles, working with Dr. Miller out of Los Gatos. My LDL went up when I went on the pure, 60% of my diet from fat with at least half of that being saturated and very low [inaudible 00:58:23]. I've been doing this for years. I said, "All right, now what's going on here? There could be thyroid things, there could be other things." We ordered an lp-pla2 test to try and more characterize the types of LDL. End of the day, looking at all the stuff, zero risk of heart disease, looking at all of the different variables in the blood. Is the lp-pla2 test something that people who have high LDL when they're eating a healthy diet, is it something that they should use or not use?

Chris: I don't know. I can't give you an answer to that. For any of these things, I think that if you're interested and you're the type of person who wants to measure lots of things and play around with them, it's something I would do. It sounds like you're the type of person who would do that to, then I think any of these things can be interesting.

What I meant when I said about the oxidized LDL, and this would apply here, about not recommending it. I don't recommend people not get it, any of these newish tests. I just don't want to give people the impression that the interpretation is so straight forward that if they're not that type of person who wants to measure tons of things and play around with them, I don't want to give them the impression that the interpretation is very straight forward and now that they get this test that they have higher quality information than anything else they could have gotten. I'm not ready to say that about very many blood lipid tests, besides the ones that are already quite popular.

Dave: In fact, that's my last question for you today. If you only could have one lab test or one lab panel that you were going to use to track your health, what would you pick.

- Chris: Oh boy. Well, I think certainly that's going to depend on circumstance. If you're talking about a biochemical profile, I really don't think that there's any singular factor that's predictive of your total health. I think it would be some kind of fitness test. I'm not sure exactly what I would pick, but I would want to pick something holistic. I'm not quite sure about body temperature yet. That might be one. Maybe you could run a mile and see how out of breath you are.
- Dave: Are you talking about heart rate variability testing? That actually might be the one that's most predictive and holistic. It even could include your one mile run test to see how quickly you return to a healthy state of variability. I don't know, I'm just guessing. Have you even [crosstalk 01:01:13]
- Chris: Yeah. I'm not familiar in the sense that I've heard of it, not familiar in the sense that I've looked into it in detail. I guess my point is, the last thing we want to try to do is to reduce health down to a simple laboratory test. The reality is that even the most reliable laboratory tests are sometimes quite difficult to interpret. What we want to do is pick a more holistic vision of total health, rather than using some surrogate marker in our blood, I guess is my main point.
- Dave: It's that question of how do you feel at the end of the day that's most important?
- Chris: How do you feel and how are you functioning. Yeah.
- Dave: Right, exactly. How do you perform and how do you feel. You said it. Chris, thank you so much for being on our show today. Can you help us close the show by telling everyone the URL for your site one more time and how they can learn more about what you do?
- Chris: Sure. My site is cholesterol and health dot com. That's cholesterol-and-health.com. My blog is the Daily Lipid. You can get there by going to cholesterol and health dot com and clicking on blog or just searching Google for the Daily Lipid, it should show up. On my blog, the Daily Lipid, I post links to anything I write elsewhere. That includes anything I write on my blog, [inaudible 01:02:31] for the Weston A. Price Foundation at



Weston A. Price dot org or anything that I write or publish anywhere else. You can also keep up with me on Facebook or Twitter.

Dave: For all the people listening to our show today, I have to tell you that Chris is one of those bloggers that I read pretty much everything he writes. That's a very very short list. Chris has definitely earned my respect. If you are interested in biohacking or interested in the Bulletproof diet or things like that, what Chris writes is very reasoned, it's well written, he thinks for himself, and I can't recommend it more highly.

Chris: Thank you so much. That's a great honor.

Dave: If you'd like to learn more about biohacking, follow us on Twitter on at @bulletproffexec or check out the blog at bulletproofexec.com. Also, I'd like to thank all of our loyal listeners and the people who come to the blog. We're approaching 500,000 page views on a monthly basis, which is phenomenal and amazing. I'd just like to say thank you for listening to our show today and for reading the blog and making comments. This is a labor of love for me. I have a full time, very busy executive job. The fact that people are listening and commenting and asking questions and that I know that this is helping feel better and helping just live more powerful lives, for me, actually, is very meaningful. Thank you everyone for listening today and all the times you listen.

What We Cover

1. Does saturated fat raise cholesterol levels?
2. Does saturated fat cause heart disease?
3. Do cultures who eat a high saturated fat diet get more heart disease?
4. Does saturated fat make your platelets more likely to clot or stickier?
5. Is there a relation between mycotoxins and heart disease?
6. Can saturated fat be protective against heart disease? Why or why not?
7. Does saturated fat cause cancer?
8. What happens when you substitute polyunsaturated fat for saturated fat?
9. Should most of your fats come from saturated or unsaturated sources?
10. Is there any reason at all to restrict your intake of saturated fat?
11. Is there any reason to eat low-fat dairy products?
12. Should you be worried about consuming bone broth?
13. Is it smarter to consume raw egg yolks as to not oxidize the cholesterol?
14. What kind of diet should you eat to optimize brain function?
15. Are the tests for oxidized cholesterol accurate?
16. If cholesterol doesn't cause heart disease, what should people be paying attention to?

Links From The Show

Featured

[Cholesterol-And-Health.com](#)
[The Daily Lipid](#)
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Food & Supplements

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Adrenal Extract
DHEA
Hydrolyzed Collagen Protein
L-Glutamine
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Lindt 85% Cocoa Dark Chocolate

Gear

HeartMath emWave 2
Evernote
HeartMath emWave Desktop

Books & Writing

Play: How it Shapes the Brain, Opens the Imagination, and Invigorates the Soul
Body By Science
The Diet Cure
The Mood Cure
Change Your Brain, Change Your Life
Getting Things Done
Other books by David Allen
A.V Costantini: Mycotoxins
The Better Baby Book

Mentions

Reams Biological Theory of Ionization
14 Steps to Eating The Bulletproof Diet
Gerson Therapy
Mind Maps

Listener Q & A Summary

1. What is Ream's Biological Theory of Ionization and why should you care?
2. Are there any ways to hack depression and bi-polar disorder?
3. How do you test cortisol levels?
4. Should you try Gerson Therapy?
5. What macronutrient ratios should you eat?
6. Can you add grass-fed butter and MCT oil in a whey protein shake?
7. What dietary measures can you take to protect yourself from heart damage after an ultra-marathon?
8. What are your favorite productivity tools and methods?
9. Can emWave training improve artificial heart function?
10. What is the proper ratio of vitamin K2 to vitamin D3?
11. Is nutritional yeast bad for you?

Biohacker Report

"EFFECTS OF CHRONIC STRESS ON PENILE CORPUS CAVERNOSUM OF RATS."

"Diets Higher in Dairy Foods and Dietary Protein Support Bone Health during Diet- and Exercise-Induced Weight Loss in Overweight and Obese Premenopausal Women."

"Blueberry supplementation improves memory in older adults."

Updates

We are getting close to the release of Upgraded Chocolate and Vanilla powder. [Click here to sign up for pre-orders.](#)

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Listener Questions

Mark

What do you think of Ream's Biological Theory of Ionization?

Guest

Do you know of any good approaches to conquering depression/bipolar tendencies?

Cody McKibben

What's your thoughts on the Gerson Therapy?

Rob

I'm a trainer and an endurance athlete. I follow a very primal nutrition plan. I add MCT oil and Coconut oil to whey protein isolate shakes. I have to use shakes a lot due to a very demanding, non stop schedule working with clients. Could you add grass-fed butter and MCT's like you recommend in coffee to a whey shake?

@Tchazzard

Do you have recommended macro nutrient targets?

@Lydbox

Any dietary prophylaxis to counteract the theoretical possibility of cardio-toxicity after ultra-marathon events?



Brendan

I've tried Getting Things Done, Evernote and a whole bunch of other productivity tools, but I still come back to a paper diary. Is there a particular methodology you use for general productivity and tracking projects and tasks?

Steve

I realize this question only applies to an almost infinitesimally small percentage of the population, but how would the EmWave and other HeartMath effects work on people with artificial hearts?

Noah

What ratio of K2 to D3 do you recommend?

Kira

I agree that regular yeast is probably bad for you, but I have lately been buying Nutritional Yeast, and it tastes amazing added to smoothies, salads etc... Do you have any concerns with this product? Here is a link:

<http://www.foodsalive.com/nutritional-yeast-6-oz.html>

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