# Paleo Solution - 352

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Robb: Hey, folks, Robb Wolf here, another edition of the Paleo Solution Podcast. Today, I have two very good friends, Jimmy Moore, who virtually everybody who is still above ground and not dead should know who Jimmy is. He is the founder of the Livin La Vida Low Carb phenomena. He is the author and co-author of multiple books including Keto Clarity, Cholesterol Clarity and the recently released, The Complete Guide to Fasting. We also have Dr. Jason Fung. Dr. Fung is a world renowned nephrologist based out of Toronto. He is also the co-author of the recently released Complete Guide to Fasting. Guys, how are you doing?

Jimmy: Hey.

Robb: Doc, are you still there?

Jason: Yeah, yeah.

Jimmy: He's much less spoken than I am. You have to like, "Jason, hello."

Robb: No problem, no problem. Jimmy and I usually have the gift of gab here. It should be no dramas with that. Guys, I think it would be really interesting to delve a little bit into how you put this particular project together, The Complete Guide to Fasting. I know both of you are fans of kind of low carb ketogenic diet. Dr. Fung, you've had huge success with folks ranging from kidney issues to just good old run of the mill type II diabetes and modifying their sleep, food, exercise, to really remarkable benefit. But how did this particular project come together?

Jason: I guess, the thing about fasting is that it's kind of really fallen off the map for many, many years. I started when I started trying to get people better. I'm a kidney specialist so I see a lot of type II diabetes. And really in order to get a kidney disease better you got to get rid of the diabetes. In order to get rid of the diabetes, you really have to lose weight. And that's how I kind of got really interested in the question of weight loss particularly around 2008, 2009 when all the studies were coming out about the low carb.

And it really wasn't killing people like we all thought. Like I thought the same thing in 2000 when Atkins was big, that people are just going to keel over with their heart attacks. By then, the evidence had shown that, no, that wasn't happening at all. So, that's when I started to get interested in that. I opened the clinic doing that. It didn't really work at all. The low carb high fat diet or ketogenic diet, Paleo diets were great but I didn't have really very motivated

patients. They weren't people who are online kind of every day looking up nutrition and stuff. They just kind of were 65, 70 years old. They maybe didn't speak English, didn't go on the computer.

They really had no idea what the hell I was talking about. Because you tell do low carb, this and that, and then they come back and they're eating rice and they're eating pasta. I'm like, "Okay, well, you didn't get what I was trying to tell you at all." That was when I started thinking about -- It makes sense what we're doing from a science standpoint but I need something else that's going to work a little bit differently.

I'm not saying that Paleo and ketogenic diet does not work. It's just that I wasn't getting the compliance I needed from where I need it. So, I needed to make it a lot easier. So, one day I was talking to a friend of mine and she was talking about these cleanses, which is like a fast except they try and sell you a lot of expensive supplements and stuff. So then I thought, oh well, that's a really bad idea, fasting, right? And I thought that's the dumbest thing I've ever heard of.

And then I thought, well, it's kind of interesting because it really worked for her. So, what's wrong with fasting? Really, what's wrong with it? I thought it was really dumb and I think most people when they hear it immediately think it's really not a good idea. My advantage is that I have a good knowledge of physiology and I can look anything up and these days it's really easy to look up studies. Everything is online and free, right?

So, I looked it up and when I started looking at it, I said, "Wow, there's a lot of data here that actually makes a lot of sense." There's actually no reason why people should be fasting. Like we're all scared about it because people tell you all these things like, "Oh, you're going to burn your muscle. You're going to go into starvation mode. You're going to be so hungry you're going to eat your microphone."

It's like they tell you all this stuff but none of it was true. So then that's when I started doing it in patients. And again, the success rate just went way up and then you set up a clinic to do this sort of thing where we actually provide people kind of guidance and help. And that's kind of how the whole thing started for me.

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So, it wasn't really like, it wasn't really my first choice. My first choice was just to change the diet. But the beauty of the fasting is that it's so simple and people kind of understand what you're really talking about. When you just say you're fasting, you just don't eat anything. And what you really have to tell them is like

it's okay. It's okay. Again, it's kind of getting people to change this mindset. So, that was kind of where I came to from fasting from my standpoint.

Because really there is just about zero people doing it. I mean, there's a few people around the world who do it on -- They bring people in and they fast them but really nobody is using it from a real therapeutic standpoint, for treatment of disease, for treatment of obesity, and really just putting kind of hundreds and hundreds of people through this. There's really nobody who's done it because I just kind of made the whole thing up.

Not that I made up fasting but really had been so far out of the mainstream. And it still is. It really is just out there. But then you start to look back and people have been talking about it. Jimmy talked about it in his Keto Clarity book which is few years ago. When was that? That was like--

Jimmy: 2014.

Jason: 2014, exactly. And there's a part in there, because I was interested because I'm like, hey, when you start to look back, it's like it's actually mentioned in a bunch of places. I think it gets kind of forgotten. It's like amongst the other stuff, it's kind of a throwaway there where I kind of put a bit of a focus back on it as a real therapeutic tool. Not that anybody has to use it but it's an option for people to do if they're really stuck.

Robb: And I think maybe to tie some of this together, like we see people succeed on a variety of "diets" when we're in a metabolic word setting, when they're basically imprisoned, people are being frisked to see if they're sneaking food in around. But in free living humans, we tend to see kind of higher protein lower carb diets, tend to work a little bit better for the vast majority of folks just maybe because of the satiating effects and whatnot. But your point about just the clinical application, like where does a rubber hit the road, where can we get people to actually do, compliance with any nutritional approach is pretty abysmal when you get right down to it.

This is why we all keep doing what we're doing because we're kind of like shaving the outer skin of the onion off trying to get the rest of the onion to get on board. And there's a quote and I'm going to totally butcher it but it's something to the effect that a perfect compliance is so much easier than moderate compliance and so it makes me think about this binary decision. Eat, don't eat.

When you are eating we won't worry as much about the food quality. We'd like to get that buttoned up at some point. Maybe if we fix the neuroregulation of appetite that will happen better down the road. But as a basic intervention to

save someone's life, the "don't eat" thing is pretty compelling. Dr. Fung, I just love the video that you have where you're presenting to a number of doctors and you relate the story of the 384-day medically supervised fast and these folks couldn't believe it.

I think they thought that you had flown in from Venus or something and were completely pulling their leg. It was kind of stunning, this idea of a medically supervised long duration fast in someone that is morbidly obese, that that would be a surprising thing that they would survive that long and not just survive but thrive, but definitely shows that the blue ocean we have in helping to keep people about this stuff.

Jason: Oh, yeah. Absolutely. I think what you say is correct about sometimes it's easier just to do, not do it at all. People talk about hunger and all that sort of stuff a lot. And the thing is that sometimes it's easier just to not start. So, if you're going to eat -- People always pretend that it's easier to eat like a few bites and then stop. That's not always easy. I mean, there's lots of situations. Like when you go pee, you start peeing, it's hard to stop.

When you're doing urine samples, you're supposed to stop. It's like, okay, it's really hard to do that. It's better just to hold it. And it's the same thing when you're eating. It's sometimes easier just to not start because then that kind of wave of hunger will just pass rather than to actually start eating and still have food in front of you and then try to stop. Yeah, you can do it once but, again, back to your point of free living humans, how many people are going to do that three times a day every single day?

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It's like, yeah, that's not an easy thing to do. And people got all kind of bent out of shape about stuff that doesn't make any sense anymore to me. People eat roughly three meals a day. For a year, that's about a thousand meals. So, if you fast for like a week a year or some people do, people get all bent out of shape. It's like, okay, you're going to miss 21 meals out of the 1,000 meals that you're going to eat this year.

And if you're 60 years old, you've eaten 60,000 meals and you do one fast and you miss 21 meals out of 60,000. Are you serious? You're really worried about that? People go all crazy especially like online and stuff. It's okay. The human body is wonderful and it can deal with that. That's why you store fat so that you have something for energy when you don't eat. That's the whole point of it. That's the whole point of body fat. I'm just using it. That's all.

Robb: And we're by far the fattest primate around which kind of -- It provides possibly a suggestion that we were wired up to go longer periods of time between feeding. There's kind of an argument for that. Jimmy, I'd like you to jump in on this. And, Dr. Fung, put your thoughts in on this also. My sense of the deal around fasting is that there is a hysteria associated with disordered eating, anorexia, bulimia.

People immediately assume that folks are sliding into that type of legitimately dangerous disordered eating. But my sense of the literature and reading about this stuff, those are completely different psychological, physiological manifestations of controlling one's food and take relative to fasting. But, Jimmy, what are your thoughts on that? Have you had a lot of push back around people saying that this is disordered eating or foster disordered eating?

Jimmy: I haven't heard that a lot from me personally because people know my struggle with insulin resistance and they're like, "Dude, go do something. That's awesome." And so I've gotten a lot of support within my circles. But I think the difference between disordered eating, as you described, and more of this controlled fasting, which is what Dr. Fung and I like to say that when you're fasting you're completely in control.

I've done several attempts at 21-day fast and I've gotten pretty close to 21 days every time I've done them. I am in total control of every single one of those attempts. And if at any point I feel terrible, the time is -- I have the control to basically stop it when I want to stop it, is what I'm trying to say. And I have. I think the first time I tried to do a 21-day fast, I made it 17 and a half days and my stomach had growled for 45 minutes in a row and I was like, "Gee, Jimmy, I guess it's time to end the fast."

So, it was just those kinds of things. You listen to your body. You stay in complete control. Never allow, "Well, I have a goal of 21 days so I'll just push through this hunger." No. If at any point you feel horrible then you stop the fast. And it's cool. You're not a failure. You got the benefits of the 17 days. Stop, enjoy the food, get back on another fast a month or so down the road. Try it again. That's the beautiful thing about fasting is the cumulative effects add up over time. And that's what I'm counting on as I continue to do these longer fasts.

Robb: Nice. Dr. Fung, any thoughts on some of the notions around disordered eating and the assumed dissociations with fasting?

Jason: Yeah. And these are, again, people who mostly have no idea because they have not yet done it and so on. So, Nassim Taleb always says these are the people who like the lecture birds how to fly. They'll say, "No, you shouldn't do it because of this." I'm like, "Okay, you have not done it. You haven't gotten people to do it

and you have no firsthand experience so what are you talking about?" But I see these comments all the time like, "Oh, Doctor, you're promoting disordered eating." I'm like, "No, I'm promoting fasting."

So, anorexia nervosa is a very serious disorder. It's a psychiatric disorder of distorted body image. And that's what it is. So, yes, those people don't eat. Just because the behavior is the same doesn't give you the psychiatric disorder any more than I would tell you, "You shouldn't wash your hands, Robb, because you might get obsessive compulsive disorder." It's like, "I tell my kids never to wash their hands." Okay, you tell me, "Okay, you're stupid," right? But it's the exact regimen, right? Just because somebody does the behavior doesn't give them a psychiatric disorder.

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Robb: That's a great, that's a fantastic analogy. No, that's an outstanding analogy.

Jason: They've done the studies because of these concerns. So, Krista Varardy, who's done a number of studies on it looked that and she said, yeah, when you have people who fast, there is no real incidents of anorexia nervosa. Now, again, context does matter because if you're telling -- I'm not telling a 16-year old teenage girl who weighs 85 pounds to fast. That's a whole different situation than telling a 50-year old man who weighs 400 pounds to fast. It's a completely different situation.

So, yeah, I wouldn't tell that person, that 16-year old teenage girl who's reading every fashion magazine there is to fast because there's no point. But you can't say that, okay, therefore, then you shouldn't tell anybody to fast. Like what are you talking about? This is kind of common sense and people kind of, as I said, you see this complete hysteria. I'm sure that this is exactly what happened with low carbohydrate diets back in the day and Paleo diet and keto diet back in the day.

There's this huge hysteria about, "Oh, you're going to eat an avocado? Oh my god. You're going to die." It's like, yeah, guys, it's okay. "You can have all olive oil." "Oh my god, you're going to die." It's the same thing with fasting now. People just have no idea about it so, therefore, they kind of assume the worst and then it gets repeated often enough that people just kind of assume that it's true.

They're all myths and that's what we, Jimmy and I, kind of set out to show is that, one, you have people who can do it, like the practical experience, and you also have the scientific data behind it, the studies that have shown, no, it does not increase your risk of anorexia nervosa or bulimia or eating disorders. And the

practical experience is that I've put hundreds and hundreds and hundreds of people on it. Now, almost all of them were overweight. I think 99% of them are like overweight or type II diabetic. And I have zero instances of anorexia nervosa because quite simply it doesn't really happen that often in a 50-year old man. It's just the way it is. But they do have type II diabetes and I do need to treat them because they will die from that if they don't get treatment.

Robb: And the incredibly costly on the way out both in terms of their family and societal burden and all that stuff, yeah. Guys, Dr. Fung, you mentioned maybe one group or one subset of folks like an already petite 16-year old female wouldn't be the best candidate for fasting. I had written about intermittent fasting back in 2001, 2002, early CrossFit scene. One thing that I've observed with -- This is more specific to like the intermittent fasting, eight-hour feeding window. I think everybody is calling it shortened or time restricted feeding these days.

But the folks that I found who were willing to do some intermittent fasting were also the folks that were doing five CrossFit workouts a week and then hot yoga and they were just like type A over the top. I definitely notice some of these folks kind of bumming themselves out. Like they would be in the tail end of 18 or 20 hour fast and then go do a huge CrossFit workout and they were just blowing themselves up.

So, that seems like another subset of folks that are probably not a great fit for fasting. Do you guys have any thoughts on that? Like are there any populations or kind of personality types that you would say, okay, this may not be the best approach for you?

Jimmy: I think if people obsess about food and have that kind of -- I know a lot of people in my community, the low carb community, they'll say, "Well, I have to count every single gram of every little thing." I mean, sometimes fasting freaks those people out although I think, Jason, that it actually would free them up if they would seriously give it a try.

Jason: Oh, absolutely. I mean, I think, Robb, you're absolutely right there. There's people that take everything to extremes. And clearly, you cannot do this forever. Obviously, that fellow who did 380 days, I mean, he started out 450 pounds. But there's all these people who say, "Well, it's tough for building muscle." I'm like, these are the people who are right there doing workouts like six days out seven. And so it's like, yeah, no, fasting doesn't build any muscle. You need to exercise to do that.

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It's not going to help you with that. So, you might not be the best guy to be going crazy on this stuff, right? But for the person who's kind of not that interested in that and more as worried about weight loss, metabolic syndrome, type II diabetes, that's what I'm talking about. So, sometimes you really -- I mean, you're absolutely right. You have to kind of define your population because there is that group of people who is really into fitness and muscle health and so on that would probably not do that well with extended fasting.

And that's not the point of extended fasting. You're not going to build muscle that way, right? But people do shorter term fast, I mean, for the 16:8, for example, you have Hugh Jackman. There are stories of Hugh Jackman, for example, who was, when he was bulking up for the role of Wolverine, he was doing 16:8. He's written about it in -- Well, he hadn't. But people had written about it in Men's Health and so on about how he found it really, really good to do.

And he's eating high protein and stuff. And it's like, I don't recommend high protein for weight loss but he has a totally different reason for doing it so, of course, that makes complete sense. You do have to take the context into consideration here. People do shorter fasts, 16, 18 hours even 24 hours but, no, they don't do like -- You wouldn't do a 21-day fast like Jimmy for the purpose of bulking up. It's not the way.

Robb: Or just basic like athletic performance or something like that.

Jason: Exactly. It can have short term benefits but it's not something that -- That's not the point of doing it. There's lots of other reasons for it but that's not one of them. So, if you're doing it for that reason, you're doing it for the wrong reason. That's what I mean we get -- That's were Jimmy and I had talked about this when we're talking about the book and Jimmy was interested. He was like, "Where can I get some good resources?" I'm like, "Well, there really isn't any. There's no book."

He says, "Where can I get a book about it?" I said, "There's really nothing." So then we're like, "Yeah, then we should write one." Because other people are going to be in this exact same situation where they really have no idea, nobody knows anything about fasting anymore, and this is an option and they want to find out a bit more about it because either they've heard about it or whatever and they have nothing to go to and that was the whole point. Let's write it, let's get exposed some of the myths, get some of the science, give people some general guidance on how to do it, personal experience, and the history of it.

The history, it's crazy. The history, it's such an old, old, old technique. There's a whole dietary intervention in the book. You go back in history and there's people

fasting for all different stuff. And, in fact, people sometimes have called it the fasting instinct. Because when you get sick, the first thing you do is stop eating, right? So, you get sick with a flu, you can't eat so you drink some chicken soup or something like that. But basically, your body actually forces you to fast.

And there's a lot of good reasons why we go into some of the physiology of it. Your noradrenaline is going up which supports your blood pressure. Your glucose gets locked down so that there's none of this for the bacteria. There's lots of good reasons why your body is forcing you to fast. But in essence, it's an instinct to everybody on the planet plus most of the mammals on the planet as well. If you look at dogs and stuff, they have the same instinct. It's a fasting instinct that's common to all humans. So, everybody thinks, "Oh, this is some new fad diet." I heard that so many times. "Oh, this is just a fad." It's like, "Oh, yeah, a fad that only goes back to the beginning of humanity.

Robb: Right. Because we didn't have three square meals a day that we could order into our houses without even leaving our keyboard. Yeah, it's a very different world.

Jimmy: So, Robb, when you did that television show, how many days did you go without eating -- What's the name of that show again?

Robb: It was I, Caveman.

Jimmy: Yes, I, Caveman.

Robb: Yeah, and it was ten days. We ate as much greens as we could find but, I mean, it literally was like going out and grabbing lawn clippings. And over the course of the ten days, among ten people, we had two trout, three frogs, three mice and a bunch of very tiny snails that mainly what you did was cut your gums on the glasslike shells trying to get the meat out. And I lost 18 pounds during that thing. A couple of interesting things around that. I went into it ketotic because I knew that we were going to starve and I wanted an easier transition into that whole thing.

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We were still working like maniacs. They had some exercise physiologists and anthropologists kind of watching us and they estimated that the amount of work we did trying to hunt and get firewood and all that type of stuff were probably burning about 4500 calories a day in this caloric deficit and the nighttime temperatures were in the teens, the daytime temperature sometimes broke above like 20 or 30 degrees Fahrenheit.

So, it was kind of cold. It was pretty rough. But I've got to say the sleep deprivation was probably worse than the fasting part because we had to always kind of be on alert. If the fire burn down, we would have to start the fire over and that was an absolute disaster. But at the end of the show we killed an elk and I'll toot my horn here. I'm the one that threw the killing shot at the elk. But we were getting ready to eat this food and I'm like, "Wait, we've got to do our blood work."

Because I talked the producers into doing blood work before the show. And then we did some blood work after the show. And although they didn't check ketone levels, they checked blood glucose levels and at the end of the ten-day fast my blood glucose was at 33.

Jimmy: Wow.

Robb: I mean, I wouldn't say that I would have won a spelling bee or put my best NCAT scores together that day but that was pretty functional. I had clearly a decent eye-hand coordination and motor skills. I could still hump along at a decent pace. I didn't want to do a CrossFit workout but like I could cover eight or ten miles to get from point A to point B. And the medical staff was just like, "This can't be right." They checked it three times and it was like 33, 35, 34. And then the other folks on the show were in the high 60s, low 70s and none of those folks went into the show ketotic.

Jimmy: Fat adapted, yeah.

Robb: Yeah, it was pretty profound but it shows that kind of protein sparing element of the fast. I was, every glycerol backbone was getting converted into glucose and used for something else. So, it was pretty interesting.

Jimmy: Robb, did you do a DEXA Scan before and after to look at maybe lean mass?

Robb: I did not and that's unfortunate that I didn't. An interesting thing, all of my weight or my gym numbers really were pretty dramatically suppressed after that like my squat, my dead lift, all that type of stuff. The one thing though they tested are grip strength before the show and after the show. And before the show, I had average high grip strength and then at the end of the show I had off the chart grip strength.

Everything that we did was just massively grip intensive. I mean, carrying things, breaking twigs. Mostly survival shows are like, "Okay, you need to build a shelter." And they have like a machete and they start chopping stuff down. We had to break all that shit off by hand and use hand axes and stuff. And it was

really hard and it was fascinating. Everybody's grip strength just like went up exponentially in that two-week period.

I definitely lost a lot of muscle because I can kind of tell that based off of my squatting and dead lifting and everything. It took me about a month to really get back up to where I was previously. But again, this was kind of an interesting scenario that would probably be counter to what we would really want in a fasting scenario. I had to work my ass off the whole time. That was still pretty stressful. You've got TV cameras on you and everything.

I think you guys would probably make the argument that doing some walking, maybe a little of easy swimming and stuff would be good. But we're not really wanting to go out and hunt and gather for your survival while in this fasted state. We would want a little more tranquil in experience.

Jimmy: Well, at that point, you certainly had no choice. You were kind of stuck in a situation that you had to perform in that fasted state whether you wanted to or not.

Robb: Right. Well, I could have quit but I had convinced myself--

Jimmy: No, you wouldn't.

Robb: I was going to die before I quit.

Jimmy: You're Robb freaking Wolf. No, you wouldn't.

Robb: Yeah, but I've tickled you. You remember that like it's a really interesting story. It was one of the only fasting studies and it wasn't really a study but that was a little done because the RIBs just won't really sign off on that stuff. It's viewed as too dangerous. You can juggle chain saws and jump a rocket plane from one side of the Grand Canyon to the other but fasting is too dangerous to really get IRB to sign off of it which is hilarious.

Jimmy: It's the key tones that made me remember, by the way.

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Jason: What I thought was interesting is that what it shows that the grip strength went up is that you actually are able to build muscle while fasted. But the point is that the body is adapting very quickly because you probably weren't doing a lot of squatting or dead lifts, right?

Robb: Right.

Jason: It's taking that muscle but it's not just burning it for energy which is what I just said, right? But it's actually using it to adapt you to that new environment. And you see this actually in astronauts and people who are bedridden. The amount of weight like muscle loss is really rapid. Like if you were to convince yourself to a bed, for example, your muscles would go down very quickly. A week and you'd be like, you've lost tons of muscle.

And this is one of the criticisms of fasting is that, for example, there is a guy, David Blaine, who's a magician and he did a stunt where he sat in the glass box of the River Thames for like 40 days and drank water only. So then he lost a ton of muscle, like 25% of his lean body mass, a huge amount. And then everybody said, "Wow, it's because he's fasting." I'm like, "It's because he's sitting in a box." That's a glass box.

Because you see exactly the same thing of astronauts. You send them up in space. There is no gravity. And their muscle within a week is like nothing. It all atrophies like quickly because, again, the body is very smart. You're not using it. You're going to lose it. But the point is, I guess, from your story, I think is very interesting, is that it's not just it just burns and doesn't build. It can build if you want to. But it's adapting very quickly to the new situation.

Robb: Right, right. Guys, what are some of the -- So, we've, I think, done a decent job of debunking some of the myths around fasting although, I think, that we could go down that rabbit hole for a long time. But what are some of the other benefits of fasting. I just saw a piece from Valter Longo doing a fasting mimicking diet and they had some really remarkable changes in immune function in some multiple sclerosis individuals.

They actually ran it head to head with a longer running ketogenic diet and it was fascinating. Like you seem to get this cellular autophagy and protein recycling and whatnot and it seems to really reset the immune system and it was interesting to me that some people like Art De Vany and some really smart folks have talked about the need for punctuated equilibrium, like we need a big change to our physiology whether it's food or exercise and we need some time to kind of come down.

And chronic anything can start becoming problematic. So, it was really fascinating to me that this fasting mimicking diet seem to confer some benefits well above just kind of a steady state ketogenic diet although I think you could make an argument for a longer running ketogenic diet for a number of situations particularly neurodegenerative diseases. But what are some of the real benefits? And maybe we could start with the stuff that's concrete and then start drifting

into some of the stuff that's a little more speculative like potential anti-aging and longevity effects.

Jimmy: Well, I'll give you the example of some of the blood work that I ran during some of the fast that I did in the lead up to writing the book. I did that 17 and a half day fast in September 2015, Robb, and tested blood lipids, obviously, blood sugar, insulin levels, inflammation levels, that kind of thing. But the most fascinating ones to me were the blood lipid levels because in that 17 and a half days, and not that I think total cholesterol means much, but in that 17 and a half days the total cholesterol dropped 100 points.

Now, there's no drug that will drop your cholesterol that quickly. And it was almost exclusively in the LDL. There was a little bit of a drop as you would predict in the HDL because I wasn't eating anything and so that did go down just very insignificantly, maybe four points. But the LDL came down that nearly 100 points. I thought that was interesting. Lipoprotein(a), this was an interesting one as well because mine has always been extraordinarily high. It's something like 430. And it dropped down to 130, which is a huge drop.

Robb: And most of the lipidologists would say that that can't shift.

Jimmy: They can't, right.

Robb: It's genetics. It's just set.

Jimmy: That's right.

Robb: Yeah, yeah, sorry. Not to interrupt but that's--

Jimmy: No, that's all right. You're exactly right. They say you can't budge that number without medication and even then you'll only move it insignificantly. So, LDL-P was around 2800 when I started and it was 1400 when at the 17 and a half days. Of course, small LDL-P wasn't that high but it also came down a couple hundred points. Inflammation levels, hs-CRP, again, was not high. It was like 0.9. It went down to 0.6.

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So, it just goes to show you just a very short amount of time you can move a lot of these blood markers very quickly. And, of course, people say, "Well, when you started eating again, of course, they all went right back up to where they were." Well, that's not true either. I tested a month later and every single one of them, while above the end of the experiment they were not back to the baseline again.

Again, that cumulative effect over time, it could be showing that this provides healing.

Robb: Right, right. Yeah. We seem to get some knock-on effect after that. Dr. Fung, a lot of people who have significant amounts of weight to lose notice really a buggerish problem of having all this skin and connective tissue that used to support that expanded adipose mass. But it's interesting, I think I've heard you mention that with this fasting protocol we tend to not see that like relative to say like a low fat high carb diet where we do actually get some significant weight loss. The folks just, they look like that they've got a couple of sails still attached to their bodies. What's happening in that scenario? Why are these folks not ending up with huge amounts of connective tissue and lose skin that needs to be dealt with potentially surgically?

Jason: Yeah. The physiology is actually fascinating because I have not actually sent a single patient to the surgeon for skin removal. Because skin removal is actually much more dangerous surgery than people imagine. There's a ton of blood vessels there and it bleeds like crazy. So, it's not easy that's why all those TV shows it's kind of like they really wait and kind of go into that only if they have to because it is kind of risky surgery.

But what happens is that the physiology is really interesting because what happens is that your body, when you don't eat, you actually start by burning all your glycogen stores in your liver, which is fine. But there's some point at around 24 to 36 hours where you don't have any glycogen and the fat stores aren't really there yet, you could have a period of gluconeogenesis, 24 to 36 hours roughly. So, probably start a little earlier and it starts to ramp up.

And you actually are going to burn protein. And that's why some people say, "Oh, well, look, you're burning protein. You're losing half a pound of muscle a day." That's not actually true because, one, it's not muscle. It's lean mass. But there's actually a lot of protein that should go and that's all that's skin and connective tissue and blood vessels that are supporting it. But there's a process called autophagy where your body will target kind of old defective protein and kind of send it into the furnace and burn it all.

And then what happens at the same time you've got this process going on, remember that fasting stimulates growth hormone, so that when you re-eat or when you re-feed you're actually going to start to, you're going to have the ability to rebuild that protein assuming you're eating nutritious meal not like just empty carbs and sugar type thing. So, it's going to rebuild that. So, what you're doing is you're actually doing a renovation. You're tearing down the old stuff and putting up new stuff which is a lot better than just leaving the old stuff there.

So, it's just like if you're to renovate your bathroom you've got to tear stuff out first. You can't leave that lime green sink in there from the 70s because you can't put a new one on top of that. So, that's what's happening in the body. I think that that's why when we do a lot of intermittent fasting we simply don't see the lose skin problem. It just isn't there. And that's why I think that the -- Protein is not always good.

Everybody thinks that any bit of, little bit of protein loss is so bad for you. Well, it's not. There's a lot of excess protein. And Ron Rosedale talks about this all the time, how he thinks dietary protein in excess is actually very bad for you. And he talks about the mTOR pathways and autophagy and so on. I happen to agree with him. The question, which nobody can answer really, is how much is too much? And that's the real kind of conundrum that people face is that is one gram per kilo too much or not enough? What is it? And that's where there's a lot of disagreement.

I think there's actually a lot but because of that kind of extra bit of burning of protein, that's what happens. Because people say all kinds of crazy stuff like, "Oh, your body, it can't burn that stuff." It's like, okay, well, look at pictures of holocaust survivors and stuff. Some of them are very obese to go in. Do you see loose flaps of skin? Or American prisoners of war in Japan in World War II, did you see big flaps of loose skin on them? No.

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Their body burnt it all. Because that's the smart thing to do. You're not going to leave it all hanging. The problem is that people get this idea where they have to eat all the time, eat all the time, eat all the time. So, we go into this kind of idea that you're eating the minute you get up to the minute you go to bed and you're never really activating this kind of pathway of breaking down, which everybody tells them, "Oh, it's really bad."

It's not really bad. It's normal. The normal renewal process is breakdown and rebuild, which is exactly what fasting does, which is exactly what kind of eating all the time doesn't do. Because you're always having a bit of protein. You're not allowing autophagy to go forward. That's the mTOR pathway that a lot of people talk about. It doesn't work. It's not physiologic. That's not the way we're really designed to go.

Yeah, we can do it for a few years but keep doing it on and on and on. And the kind of -- One of the things that, from a theoretical standpoint, which is very interesting, is Alzheimer's disease because, again, you get a buildup of gunky protein the brain that's clogging things up and not allowing to work properly.

And guess what, fasting is way to break, that will break down protein. And perhaps this is a way that you can actually stimulate it.

So, I think the whole area of fasting and neurodegenerative diseases, dementia, like Alzheimer's dementia, is fascinating because you have stories of people who fast and they feel like their mental capacity is like on fire. That's what my friends said. He's an emergency room physician and we talk all the time. He tried the fasting and he's like, "Holy crap, I feel like my brain is on fire when I'm fasting. I feel like I can do anything and solve any problem."

And then back to stories in World War II, there's this great book by Laura Hillenbrand called Unbroken. It got turned into a movie. And I remember reading it, their stories of World War II prisoners war who are basically starving. They're ketotic for sure but they're starving. And they're doing these incredible feats of mental ability. Like one guy learned Norwegian in a week and another guy was reading books purely from memory.

They were all blasé about it. They're like, "Yeah, that's just what you see when you starve. You can do anything mentally." I'm like, "That's amazing." These are incredible stories. And Pythagoras, the Pythagorean theorem, that's very brilliant ancient Greek mathematician, he used to send his students and tell them, "You have to fast I think 40 days or something before you can come to my class." Because he wanted them to be on top of their game.

The ancient Greeks fasted for cognitive ability. So it's like, oh, no wonder they're so brilliant, all these philosophers and stuff, Plato, Cicero and stuff. And we're still talking about them. They were all fating not because they're fat, because they weren't. There was very little obesity at that time. But because they knew that--

Robb: There was a performance hitch.

Jason: Yeah. I was like, "That's incredible." So, there's a group out in California, Silicon Valley, who's decided that this is a perfect biohack. You want to do better on that test, you want to do better at work, you want to be more productive, hey, fasting is a terrific way. It's free. It's available to everybody. So they started a group called WeFast and they've got like hundreds and thousands of members who are just fasting all together and don't eat and break their fast together and all this kind of stuff. It's terrific.

And for them, it's not because they need it for metabolic reasons. I mean, they're all like skinny 20 something year old computer programmers, right? But they do it because it gives them an edge. And you know what, it's a competitive world. And for them, that extra edge is worth a lot of money. It's your career.

And, hey, so you don't eat for a little bit. So what? You're going to get a huge boost on performance here, like mental performance.

You can look at studies of memory where they fast, people and then do memory test and it gets boosted quite a bit, the memory ability and stuff. So, there's lots of stuff. And you just think yourself. Okay, so you eat a giant thanksgiving meal. Are you really sharp or the only thing you can do is sit on the couch and watch football? Everybody thinks feeding makes you sharper like mentally, mental clarity. It doesn't. Nothing does it like hunger. You say, "Oh, I'm really hungry for power, hungry for promotion." Does that mean you're lethargic and slow? No. It means you're on edge and totally with it.

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And that's exactly the physiology of it. I think the mental part of it as a biohack, as a performance enhancer and stuff, I think it's a fascinating field to look into. That's what some of these people, Mark Mattson, for example, and then Tom Seyfried talks about cancer and fasting and Valter Longo talks about anti-aging and fasting because of this whole kind of breakdown and renewal cycle that you get. My only thing with the fasting -- Mimicking diet. Why mimic it when you can--

Robb: Just do it, right?

Jason: If you're like underweight then maybe you need it but, hey, why buy the whole fasting mimicking thing when most of us have 20, 30, 40 pounds of food sitting around our bodies and we can do it for free.

Robb: Right. Guys, the state of fasting ketosis is similar but definitely different than nutritional ketosis. We tend to see elevated level of blood ketones in the fasted state. We tend to see suppressed levels of blood glucose relative even to nutritional ketosis. What are the exact differences there and where -- Clearly, like Jimmy, you've been ketotic more or less off and on for years but you seem to really get a boost from this fasting effect and it wasn't just during the process but after the process. So, what additionally is going on there just the whole -- Like is there an inflection point that we've got to get beyond to get that autophagy, to get the increased growth hormone levels and whatnot? What exactly is it that we're getting out of the fasting that we maybe don't get from a continuous state of ketosis?

Jimmy: I think most people probably do get benefit from a ketogenic state which very naturally adds in those periods of intermittent fasting. So, I would say the vast majority of people, that's probably the benefit that they're getting. But then you've got people like myself who have struggled with this for many years, the

insulin resistance, and I think this is that one extra step for people like me who can't necessarily get all those effects just from keto.

So, what I found is it boosts the ketones extraordinarily quickly. Within three days I can go from 0.6 on the blood ketone to maybe 0.8 in day two and then day three it just jumps to 2.8. And so by day three I'm really mobilizing fat for fuel and it really kicks in and I feel it at that point, really, really feel it. So, I tell people fasting is a ketogenic diet on acid. And it's a good thing because the blood sugar then comes down and you know healing is starting to take place. Which is why I like doing the longer fasts.

But I'm not going to fast for three days. I'm going to fast for at least seven. I'm not just going to get to three and go, "Oh, well, this was nice," and then end them. No, no, no. This is when I start feeling good. I think that's the biggest difference between keto and fasting for someone like myself is I think it gives you that extra umph that you're looking for to make the healing happen. Whereas if I stayed continuously keto all the time it may not provide quite the same healing simply because of my past dietary choices that have put me in the situation I'm in now. But I do think, Robb, most people could probably get away with eating a ketogenic diet, having those natural periods of intermittent fasting.

Robb: Got you. Got you.

Jason: I think that's exactly right. I think you start to get a lot of benefits by kind of 16, 18, 24 hours. On ketogenic diet, you kind of naturally, as long as you're not forcing it. Some people say, "Oh, you have to eat no matter what." I think that's crazy. But if you're kind of naturally getting that 16, 18, 20 hours anyway then you're starting to get all those benefits. But the key is that the fasting gives you a complete hormonal change. It's not simply the ketones. That's not the whole story of fasting.

It's everything. Your whole physiology changes. So, your insulin is going down, your glucose is going down at the same time your counter regulatory hormones which are the hormones that run counter to insulin, so as insulin falls, things go up, and those are noradrenaline and adrenaline, growth hormone, cortisol. So, yes, cortisol does go up. It is a stress on the body but so is exercise. So, you have to play it. If cortisol is a real problem and fasting can be a problem for some people then maybe it's not for them.

These are counter regulatory hormones. And remember, one of the other things is the sympathetic nervous system. So, the sympathetic nervous system, remember, also runs counter the adrenaline and so on.

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So, in essence, what's happening is as you don't eat, as you fast, you're not simply talking about changing the ketones but you're activating your whole system. Remember, the sympathetic nervous system is basically an activator. It activates your whole body. That's why people say when you're hungry for something you're activated, you go get them, you've got tons of energy. That's what fasting gives.

I have people who drag themselves in the door the first day and then they come in the next time and they're like, the husband is like, "Oh my god, can I even keep up with them? They have so much energy." Because the sympathetic nervous system is activated, the noradrenaline is pumping, the growth hormone is pumping which is building to build this lean mass, right? So, it's really a total change in your hormones rather than just ketosis.

I think if you are following a ketotic diet you kind of naturally will have this anyway. The other interesting thing is you see changes, for instance, in ghrelin, which is the hunger hormone. This is one of the things which I actually think is very, very interesting because if you do a caloric restricted diet, over a year, if you lose weight, and this is on a standard sort of calorie counting diet, eat seven to six times in a day, on a standard sort of diet, at the end of the year, the ghrelin is higher, which means you're hungrier.

So, everybody says, "Oh, you fell off your diet because you have no willpower." That's just not true. You're hungrier. It's not just a psychological state. Your hormones are making you hungry and your metabolic rate has gone down. So, why is this so hard to understand why people regain this weight? That's the thing that always kills them. You're more hungry, your body is shutting down, you're going to want to eat. Your body is screaming at you to eat after you've lost weight the standard way.

With fasting, you see the exact opposite. So, if you look at ghrelin, it peaks at day two and then drops every day after that. So, at 48 hours or so, you kind of get to that stage where, "Oh, I'm never going to make it past this." By day three, it's a bit better, by day four it's okay, by day five, it's like, "Man, I could just go on forever." Because your ghrelin has gone right down, your hunger has disappeared, and you can just keep going as long as you want. As long as you're burning body fat your body is being fed.

It's just being fed with a fat which is food that's stored away from before. But if you look at resting metabolic rate, again, you see the same advantage. So in the study Catenacci, who just published in 2016, looked at alternate daily fasting, so 36-hour fast kind of every other day for 32 weeks. One, to answer the question

about lean body mass, it was approximately four times better preservation of lean body mass compared to standard calorie restriction.

With that resting metabolic rate, it was not significantly different at the end of the 32 weeks, which is more than half a year than when you started it compared to the calorie restricted diet where they went down about 76 calories per day. So, basically, your body is shutting down with a calorie restriction and it's not with the intermittent fasting. So, this is huge. If you're less hungry and you're burning more calories you're going to be able to keep that weight off. It's the difference between success and failure.

Everybody thinks it's about willpower but it's not. It's about correcting the hormonal problems that have led you there that are preventing the weight loss and leading you to their weight regain. And that's what we fixed with the intermittent fasting. It's fantastically interesting but it's a multitude of hormones, not just a single thing.

Robb: Right. Just a fascinating side note. Ghrelin is really a big player in addictive behavior. When you talk to addicts whether it's nicotine, caffeine, cocaine, they describe that process as a hunger essentially which is largely driven by ghrelin and so it's interesting and I wonder if there's some indirect effects there even on some of the other addictive behavior. Maybe if there was kind of addictive behavior associated with eating, to your point, Doc, if the individual's ghrelin is dysregulated and they're always hungry then really can you call it addictive behavior or it's just they're getting a signal that they have lots of energy stored in their body but they're getting a signal that's telling them something different. But if we could reset that, I wonder if there's some benefit in some other areas beyond just eating.

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Jason: I think that's what we see too because there are people who say, "I was addicted to carbohydrates," but then they start fasting and it's like, "You know what, it's like, meh. It's all right. I could eat it if I want to or I could not eat it." Maybe ghrelin does have a big thing because it is this whole change that happens that in the addiction -- That's very interesting about the ghrelin. I actually had no idea about that in the addictive pathway. But totally makes sense from clinically what we see, it would kind of fit right in, that it would be much improved.

Robb: Right, right. Well, guys, this has been awesome but I want to be respectful of your time. We're blasting over one hour mark here. Jimmy, let folks know where they can track you down on the interwebs and also how to track down the Complete Guide to Fasting.

Jimmy: Yeah. I'm the easiest person to find online. Google my name, Jimmy Moore, and the first two pages are all my stuff. That's what happens, Robb, when you're up there a long time like you and I have been but, yeah. Do that. But livinlavidalowcarb.com is my website. But you can get the book anywhere books are sold, Barnes and Noble, Books-A-Million, Amazon, of course. And we have it in Kindle, paperback as well as audio book which I had the great privilege of reading. When you're a podcaster people want to hear your voice. So, I was like, "Jason, you want to read this?" "No, you can do it."

Robb: Right, Right. Yeah. I tried to format my first book and it didn't happen. So, I'm going to have to do the second book. Dr. Fung, where can folks track you down on the interwebs?

Jason: Yeah, they can look on my site. It's www.intensivedietarymanagement.com. And the other site, which is really a terrific, terrific resource is www.dietdoctor.com. They've got tons of recipes and I have post articles there also on the intermittent fasting and so on. There's a subscription site for people. It's like $9 a month or something. And in that you can ask me questions and stuff. I'll answer them when I get a chance kind of thing. That's a terrific place as well.

Robb: Fantastic.

Jimmy: And I'd like to give applaud to the Fung Shweigh Facebook group. If you're interested in fasting, that's a very active group of Dr. Fung's, I guess, biggest fans who have been doing fasting. Fung Shweigh is the name of the Facebook page.

Robb: Okay, I'll link to all that in the show notes. That's awesome. I didn't know that was going on.

Jason: Yeah. And don’t forget that Jimmy and I are doing a podcast as well together.

Jimmy: Oh, I heard about that.

Robb: Tell us about that. What's the goods on that?

Jimmy: I's called Fasting Talk with Jimmy Moore and Dr. Jason Fung featuring Megan Ramos who works with the intensive dietary management program with Jason. We started that at the beginning of this year and, yeah, we have about four, five episodes out now and it's rocking and rolling. We're answering questions all about fasting. I think it's the first of its kind. Nobody else is doing an exclusive podcast just to the subject of fasting. But fastingtalk.com. It's also on iTines, wherever you get podcast, you can hear Fasting Talk.

Robb: Fantastic. Okay, we'll get that in the show notes. Guys, it was fantastic having you on the show. Congratulations for getting this fantastic book done and really doing amazing work like the ability for folks to tinker with the simple intervention and really give them a fair shake and see how it benefits them. We've never had an opportunity like this in history before so it's very exciting. Are you guy going to be like AHS, Paleo f(x), anything like that?

Jimmy: There's a lot of keto conferences this year so I had to cut out the Paleo. I'm speaking in like seven of the eight keto conferences this year. So, I won't be at either one of those but, obviously, the low carb crews and all the different conferences. That's the beautiful thing, Robb. This community has grown and expanded so much that it's more than just a couple of conferences now.

Robb: Right. Well, I think ketogenic diet was the most searched term on Google last year, something like that. There might be something to that. It might be catching on a little bit.

Jimmy: I've heard.

Robb: Yeah. Well, guys, thank you again. Really an honor to have you both on the show. I'm looking forward to catching up with you guys again soon.

Jimmy: Thank you very much.

Robb: Okay, bye.

Jason: Thank you.

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