

## Paleo Solution - Episode 313

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Robb Wolf: Hey folks, Robb Wolf here, another edition of the Paleo Solution Podcast. I'm super excited for today's guest. Mark Sisson needs no introduction but he's getting one anyway but the main introduction I'll give him is that he's been an incredible friend, fantastic mentor, and just all around a great guy. Mark, how were you doing?

Mark Sisson: I'm doing awesome. Thanks for having me Robb. Always great to talk to you as you know and great to be here.

Robb Wolf: Well, you don't let a lot of grass grow under your feet. Let folks know a little bit of you've been up to?

Mark Sisson: Well, I feel like I spent 8 years building a brand in the Primal Blueprint and then in the last 18 months or 2 years, finally really deploying it in a way that's -- I think the strategy is to change the way the world eats right. So the food company Primal Kitchen is taking off. We introduced the mayonnaise a little over a year ago and it's just killing it. We're in about 850 stores right now. We just introduced a chipotle line flavored mayo, some salad dressings, a new dark chocolate almond bar that's a great source of grass-fed collagen. So that food company is just going gang busters.

And then about 3 months ago, we had our first open house for this restaurant franchise also called Primal Kitchen and I think we're 40 franchises into it right now. We've got space sold for 40 franchises. So just trying to make hay while the sun shines as they say and feeling really good about the State of the Union with regard to Paleo and Primal.

Robb Wolf: That's awesome. That's fantastic. Yeah, I got to see a decent amount of the menu offerings for the Primal Kitchen as you guys were kind of beta testing a bunch of that stuff and it looks super exciting. I'm hoping that I'll make the guest list on a few of the grand openings when those things start rolling out just throwing a plug out there on that.

Mark Sisson: Absolutely.

Robb Wolf: You've also recently released your most epic book in my opinion to date. All of your books have been fantastic, but you just released Primal Endurance and we were talking a little bit before we start rolling. I

honestly think this is your best book by a mile and all of your books are fantastic, but this thing is outstanding. I knew folks know about you. I don't know that everybody knows about your endurance background. You know a little bit about endurance and not just kind of fiddling around with it, but actually I'm using my air quotes here, finishing races and not just finishing them, but finishing them fucking fast. Talk to folks about that.

Mark Sisson:

Yeah, it's a yes. No, it's interesting and so my athletic career was as an endurance athlete almost de facto because I couldn't do any -- I didn't have the strength to compete in some of the football or baseball, or even basketball for that matter. So in the late '60s, early '70s, I gravitated toward running. I became quite good at running and that's the era when Kent Cooper sort of launched the aerobics movement. So anything you did was aerobic in nature was contemplated to be good for your heart and exceptional for your health. So I bought into that hook, line and sinker, but I wound up incurring injuries and the maladies that arose as a result of the diet that was sort of obligatory in those days, you know the high-carbo hydrate-based carbo loading glycogen management routine.

So when I retired, I just not only I wanted to just re-access my good health. I wanted to be fit. I wanted to see if I could be fit and healthy at the same time which they're -- up to then was not possible. You could be really fit, but then you sort of sacrificed health, right?

That's really what started me down the path of the Primal Blueprint. So over the years, I've coached professional athletes, coached professional teams, most of like -- a lot of my friends know me as coach. That's what they call me so it's not like I'm coming to this as a brand new sort of adherent wide-eyed and just having done the research. I've been doing the research for 35 years.

On Mark's Daily Apple, I wrote about chronic cardio. Devane and I sort of coined that phrase to describe what happens when you train at a heart rate that's too high to actually promote aerobic endurance and promote fat burning, but too low to give you any sort of threshold training. Yet it became this black hole that people trained in for the longest amount of time. It's almost as if my career was based around training to hurt. In other words, I would go out and I would run a lot of miles and prepare my brain for the discomfort of racing in a marathon.

For the last 10 or 15 years, I've written about how devastating the old way of training was for most endurance athletes and how antithetically it was to health. About five years ago, we started to see a shift in the

research and we started to -- I started to notice that there are some ways in which you can train, there are some ways in which you can reconfigure your fuel partitioning such that you could not only train in a kinder, gentler fashion on your body so you wouldn't burn out, so you wouldn't get injured. But in a way that you would learn to burn fats so efficiently that you would spare glycogen, so that whole carbo loading component that whole focus on glycogen management sort of receded to the background and you just became a more efficient athlete and you didn't get sick as often and the training was all of a sudden the possibility of having fun during your training arose.

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Three years ago, my co-author Brad Kearns and I set about to write an entirely new approach, a strategy for training for endurance contest and it's called Primal Endurance and it calls upon things I've been talking about for 10 years with the 10 Primal Blueprint laws, but really puts them into very specific strategies. Here's how you can learn to burn fat more efficiently through dietary intervention without even having to train. Here's how you can learn how to burn fat more efficiently in training, but do it in a way that uses the heart rate to keep you on this and keep you on its own. It's fully aerobic and doesn't venture into this no man's land of wasted time where you're actually going to -- like I said, too hard to make a difference and yet not hard enough to make a big difference and beating you up along the way.

For the longest time, endurance athletes avoided the gym. It's like, okay, I'm a runner. I don't want to get big bulky muscles. I don't want to go into the gym and maybe hurt myself lifting heavy, same for cyclists, same for swimmers. We know that now to be maybe having overlooked critical component of maintaining sustained power in a race. So we took and look at what you can do in the gym. Very specific work that you can do intensely in the gym, brief periods of time, it doesn't take a lot of time. It doesn't hurt that much for very long, but contributes to your ability to race faster and become stronger and enjoy the rest of your life. So all of these being put together are now a strategy for creating an endurance athlete that uses this entirely new technology that has only risen really in the last 5 or 10 years.

**Robb Wolf:**

That's fantastic. Mark, how were you recommending that people stay within that aerobic pace zone? I come from more of a power athletics background. I've been getting deeper and deeper into the old guy Brazilian jiu-jitsu scene, which is very glycolytic sport and I've never taken the time to build an aerobic base until about the last year to 2 years. I have been spending a decent amount of time and that 130 to 150 beats per minute range doing some mixed modal activity, but trained to build

that aerobic engine and it's just been amazing for me. I've used some heart monitors and some different things like that, like how far down the rabbit hole do you recommend the folks go on that monitoring? I know Phil Maffettone really was one of the pioneers in this and he gets fairly neurotic about keeping people within these tight lane lines like in managing that.

Mark Sisson:

No. It's really interesting because for the longest time, I've been promoting this sort of intuitive method of training like okay, let's not get so caught up in the quantified self. Let's not measure so many of these variables that we get neurotic about it and yet when it comes to the heart rate training and when it comes to this staying in the aerobic arena, it's critical that you do proscribe a certain range of heart rates in order to maximize the efficiency.

We're going to have to spend about 5 minutes going into the science behind it, but it's pretty cool stuff. Basically, we take a number that Maffettone helped described over decades of doing research and it's basically 180 minus your age. Now, people have different heart rates and there's a lot of different sort of variabilities, but 180 minus your age, plus or minus 3 to 5 beats gives you a range in which you are most efficiently putting oxygen through your body at the highest possible rate. Now, what I mean by that is, let's take me for example. So I'm 62 now, holy shit.

Robb Wolf:

Just dog years. Just in dog's years.

Mark Sisson:

180 minus 62 makes my aerobic heart rate, my training heart rate 118. Now, I never used to run anything that slow, but here's what happens. When my heart is beating at 118, I know that to be the fastest or highest heart rate I can sustain and still be using mostly oxygen. Now, when I talk about using most of the oxygen, I'm also putting maximum oxygen through my body and mostly burning fat. So I'm burning fat at that rate.

Now, if I'm not a very good fat burner, the heart rate is going to do what it's going to do. Maybe I'm going to -- at 118, maybe I can only walk 13-minute miles. But if I'm a very efficient fat burner, I might be able to run 8.5-minute miles at that same pace because I know that by putting oxygen through at a maximum rate and not going into any sort of lactic acid build up, I'm maximizing my oxygen throughput and my fat burning at that time.

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Why would you want to do that over time? Because over time what you find is if you use the heart rate as the limiter, and you stay within that

zone, over time, you become more efficient. So now my 8.30 miles become 8.15 and then it might become 8 minute miles and then it might become 7.30 miles. Even at the same heart rate of 118, now I'm running more efficiently. I know I'm burning fat because I'm putting more oxygen through it. I'm not building up lactic acid and I'm going faster. I have become more efficient at burning fats.

Now, what that means is when it comes time to start to add, to layer on, some of these other nuances like start to do some sprint or start to do some work in the gym or start to do the occasional time trial or tempo. Now, I start out burning fat in a much higher rate than my training partner who has chosen not to train this way and he's out there riding his bike at 150 to 170 beats a minute all the time and practicing to hurt.

It's really about building an efficient machine with the base building so that when you do start to ramp up the intensity, you're starting from a perspective of maybe deriving 70% or 80% of your calories from fat and not 70% or 80% of your calories from glycogen. And the reason -- of course you want to do that and in endurance events, glycogen is a very fast-burning commodity and it doesn't -- we can't store much of it. We run out of glycogen very quickly.

Robb Wolf:

And once you get those, the blood sugar dropped with that and then the whole brain signaling shuts down. This is where we get bonks. We get hypoglycemia so if we can forestall that and it gives us a huge buffer.

Mark Sisson:

A huge buffer. Now what you're seeing at the elite level now are guys who are training low carb and who are becoming so good at burning fat and are building the metabolic machinery to burn ketones. Now, you talk about the brain and blood sugar. One of the things that shuts us down over the years and research said, well, your muscles can only store a total of 500 or 600 grams of glycogen. Of course 100 grams goes to your liver to run the brain so that doesn't even leave that much for the muscles and the muscles never get below 150 so you only have like 250 to 300 gram window of glycogen storage in your muscles ever.

But so the theory was initially, well, when your muscles run out of glycogen that's when you hit the wall. Well, the guy named Tim Noakes took this step further and said maybe that's not what's going. Maybe it's when your brain runs out glucose that it gets to signal it all hell is breaking loose and you need to pull over and take a nap and he promoted what he thought to be the central governor theory of the brain that it was the brain and its relationship and dependence on glucose that was what ultimately caused you to bonk. Some people had a little bit of

an ability to override that for a little bit longer than others, but ultimately when the brain runs low in glucose, that's when the whole central nervous system started to fall apart and slow down or break down.

What happens now when you learn how to burn fat really efficiently and as a byproduct of that fat metabolism and you're creating ketones? The brain runs really effectively on ketones. The brain loves ketones. By the way so this cardiac muscle so as this striated muscle so ketones draw a wonderful additional fuel. Well, if you can get to the point where you've trained your body to build the metabolic machinery, you burn fat efficiently and your brain is able to use ketones efficiently now you've unburned yourself of the necessity of having to take in a gel pack at hour two or hour three of an event. Now you've allowed your brain to continue to go, hey things are great. I'm burning ketones. I don't need to pull over and take a nap. This is awesome. And my muscles know how to burn fat efficiently and I've dialed in the training strategies and the heart rate and it worked on my sustained power in the gym. What we're seeing is people are actually in the longer events are starting to set world records using this low-carb fat adapted ketogenic training strategy.

Robb Wolf: Mark, are folks using any targeted carbohydrate during those events? Are they shifting from kind of a train low race high kind of thing or how was that playing out.

Mark Sisson: Yeah. So a lot of guys are doing exactly that. They're training low and racing high and what that means is when you train low-carb and you've built the metabolic machinery to burn fats efficiently and to burn ketones, it doesn't mean that you stop burning glucose. It doesn't mean you stop storing glycogen as a result of taking in carbohydrate. One of the things that was an early assumption which was well when you start eating carbs before a race or during a race, then your whole ketosis thing is shut off because of the carbs and you're going to be a train wreck.

We know that now not to be true. So you can actually train low, build this metabolic machinery and then the night before an event or even the night before a hard glycolytic contemplated work out the next day. You can build up glycogen stores with 150 maybe 200 grams of let's say starch or something and load up and the next day now you have full glycogen stores but you're still a fat burner. You're still able at the submaximal heart rates to derive most of your energy from fats but if you need to go to max if you need to go glycolytic, if you're on a bike and you need to climb that third hill all out, you've got the power and you've got the glycogen stored to do it. It's a kind of a cool adaptation that allows you to take the best advantage of all of the fuels in your body.

Now, what people are doing that there's companies now making supplements. You can make this super starch which is a very slow burning, slow access carbohydrates. So whenever you take it in, there's no impact on insulin for instance. You can take in 30 grams an hour which is really all you need if you're going quite hard as an endurance athlete and you've become good at burning fat. So you never have any issues with blood sugar because it's a perfectly designed carbohydrate that you don't need much of. I think the days of high glycemic index gel packs and all of the stuff that upsets your stomach are near coming to an end.

Robb Wolf:

And Mark, maybe worth mentioning that one of the greatest challenges I think that people have had historically when they're using the goo and the high-glycemic load carbs. When we're exercising, depending on the intensity level, we start shunting blood away from the digestion and towards the muscles and in some folks, that has resulted in actually ischemic injury to the gut. They actually...

Mark Sisson:

So famously Julianne White, one of the -- I think she was Ironman Canada about 15 years ago and he was immediately taken to the hospital and had 12 inches of her bowel removed because she would have died from the peritonitis and then related to ischemia and that's one of the most powerful example like in sight. Yeah, that's what's going.

So that's sort of the worst case scenario is that you start to wither and die from the inside. But even before you get to that the stomach doesn't empty that the intestines are not as efficient at transporting those nutrients into the blood stream because for exactly the reason you just cited because whether it's high heat and you're trying to cool yourself but it's -- the intensity of the effort and the blood being shunted to all the working muscles and in triathlon it's not just the legs because you're doing more than running, you're swimming and you're cycling.

So very, very sort of interesting analysis of what is going on and one of the reasons that so many people suffer gastric upset. Even if you have decided well I'm going to be a sugar burner for the rest of my life and I'm going to be taking in 60 grams of carbohydrate starting at hour three of the event and going on until I finish. Well, whether you might be consuming those sugars in a liquid form but you may not be emptying into the stomach and that -- so the stomach upset is one issue. You just -- people stopping and throw up because they're not emptying or more importantly they're just not getting those nutrients into their blood stream.

Robb Wolf: Right and so if you are more fat-adapted and more specifically I guess ketone-adapted then we're pulling nutrients out of the adipose tissue, pulling a little bit out of the liver and so we're bypassing the need to really ping the digestive tract either at all or much, much less intensely to be able to keep the base level of energy flowing in that we need.

Mark Sisson: Exactly, I mean some of these guys who are doing 100-mile cross country races, the only reason they eat and they might eat peanut butters or a little concoction of some high fat MCT oil and that type of thing. It's almost just to tell their stomach they're okay, just to get a little bit of something in their stomach not because they actually need that much fat or that many calories.

**[0:20:13]**

One of the things that I think people still just can't quite get their brain around is this is the idea that even at 7% body fat which very few people are. A 150 pound person still has 10.5 pounds of fat and at 4000 calories that used to be 3500. Now, we think it's more like 4000 calories per pound of fat and 100 calories per mile cost of energy. You've got like 400 miles worth of walking or easy jogging in you a stored fuel. So it's not like you ever are realistically going to tap out your own stored body fat and even in long endurance contest.

Robb Wolf: Right, right. Mark, how -- I've still been trained to crack this nut for more glycolytic-based activities like jiu-jitsu and mixed martial arts. What are your thoughts on that like is there a potential -- when I've seen a very anecdotal, very anecdotal but I've seen strength athletes, power athletes too pretty well on a ketogenic or acyclic ketogenic diet clearly have seen lots of endurance athletes like it seems like the longer the event the more amenable ketosis is to this process. But this mixed-glycolytic deal like boxing, kickboxing, grappling and maybe even like soccer, I just haven't seen a ton of success there. Like what are your thoughts on that? Like can we goose it towards fat adaptation, but those folks are still going to maybe need 100 to 200 grams of carbs most days maybe portioning in post workout so we get some fat adaptation. We do our aerobic threshold training to get as much mitochondrial density as we can and whatnot but we're still going to need more consistent carbs like...

Mark Sisson: Yeah, I think you're right. I think you'll goose it. I think you tweak it with the understanding that the ideal is available if you can find the right training combinations. The ideal would be I'm really good at burning fat and I'm able to store enough glycogen in my muscles for about and I have available enough, maybe short-term carbo intake between rounds so that I'm maximizing on all -- still I'm firing on all cylinders. I'm maximizing all fuel sources.



Now, with that looks like, it might be that cyclic ketogenic style of training where you spend a couple of weeks in ketosis in the off season and literally, your goal is to build the metabolic machinery to become good at burning fat because that really doesn't go away unless you start consuming 500 to 600 grams of carbs every day for three weeks. Whatever you do in terms of mitochondria, they're going to stick around. You have to give them a reason to stick around but they will.

So if you have up regulated that mitochondrial biogenesis and you've improved mitochondrial efficiency because you've taken 2 weeks in ketosis and in that time, you've ramped your glycolytic training way back and you're just doing that sort of low anaerobic stuff with the intention of building an aerobic base. But then as you go into other phases of your training and we look at one of the things we talked about in Primal Endurance is inconsistency as the key. It's periodicity and figuring out when it's time to go hard and when it's absolutely not time to go hard and becoming intuitive about that. When you are able to get and dial that in, then you so you build an aerobic base, you become good at burning fat but then you can – say well, tomorrow I'm going to be doing a hard-glycolytic work out and so tonight I'm going to have an extra 150 grams of carbs in the form of yam or sweet potato or whatever, fine. You haven't taken any steps backward and you certainly have maxed out your carbohydrate storage for the next day.

By the way just because you're ketogenic and just because you're low carb, it doesn't mean you're not storing glycogen. It just means you don't store it as quickly. So to replenish glycogen stores, in the old days you might have taken 16 hours starting from immediate post workout consumption of a high-carbohydrate source and now it might take two days because you're not taking in enough carbs but your body still wanting to replenish glycogen. It's not going to overflow the way it would in the old days of carbo loading but it will fill sufficiently that as long as you don't too hard glycolytic days in a row which I just think it's kind of silly to do anyway and this doesn't -- there's no reason to do that.

As long as you plan the strategy out if you can either load tonight for the plan workout tomorrow or you can just say, I'm not going to work hard that hard again for three days so I'll let my -- the glycogen storage happen naturally even on a low-carbohydrate strategy. By the way, the third alternative is to say, I'm just going to train depleted tomorrow. I'm literally going to train depleted and see how far I can go depleted because there is a method to that madness as well.

**[0:25:48]**

Robb Wolf: Right, right this has been a little bit of the challenge for me matching this up with jiu-jitsu training because depending on who your partner is, it may be a battle for your life to make sure that this 220 pound, 20-year-old white belt doesn't rip your arm out of the socket and so you're not able to pace things quite as easily. So even though I tried to structure it so that I'd stay more on that aerobic zone, sometimes it's a little challenging to do that or it's like the run, bike, swim, or some of these less-open ended activities are a little more amenable to planning and in implementation.

Mark Sisson: Yeah, where you could pace yourself exactly. When you can use a heart monitor to kind of keep you honest and keep you in line. It's easier to plan long-term strategies, but you're right. If someone jumped into your ass and try to beat you into submission and their timing hasn't coincided with your timing...

Robb Wolf: It's a bad day, yeah.

Mark Sisson: It's a bad day. So what happens to a body that is adapting to this fat-burning strategy, there's a kind of a curve and one of the things that happens is you may become fat adapted early on but you may lose some top end power. Peter Attia noted that quite aggressively in his first couple of years of training as a ketogenic athlete. He said, I lost my top end power for about a year but when it came back, it came back fully and then I had all the top end power, plus I was able to tap in to my fat stores, plus I was able to recover from brief glycolytic bouts.

In his case it would be cycling so you're again you're doing random train. You want to maintain power up to 30 or the same power you had going up the first hill. And one of the training strategies for that is to say well, if you've never trained muscle fibers deeply enough -- when we talk about doing endurance contests, you don't necessarily think about power but every time you turn that crank on a bike, every time you had a leg turnover and to run, there's some power. You can argue that you're doing 20,000 repetitions of a 17-pound weight, right, but so that's why people have historically not gone into the gym and trained for any kind of power when they were endurance athlete but what they did, they went and did 30 repetitions of a light-weight or something.

Well what we've seen quite recently is that you can go to one of the gym and you can load up with really heavy weights. I'm talking -- we talked about 80% of your one-rep max in the book. We talked about doing a maximum sustained power workout where if it's a weighted squat, you might do four, five repetitions if you can of 80% of your max and then

wait 10 or 15 seconds and try to do a few more and weight 10 or 15 or 20 seconds try to do a few more.

So instead of just saying okay, I've done five and I'm done and re rack it. You stay there in a position and you get a little bit of a recovery but then you load the muscles again and then you load them again and when you can't complete one more rep, the workout is done. What we've seen is okay, they're -- now you've established the baseline of how many reps you can do of your 80% of your one-rep max and in the first couple workouts, it might be eight or nine reps full stop. But over time what we see is, people can go two, three, four, five minutes because their training that those muscle fibers deeper and deeper to sustain that power over time. Even though we're getting significant rest 10, 15, sometimes 30 seconds, we're still loading the muscles and we're still accomplishing more work in the workout than if you've done a set of five to begin with and then a set of three after a two-minute rest and then a set of two and then we rerack the weight and gone to the other next exercise.

So we got up with Dave Zabriskie to a point of where he was doing these jumping weighted squats for eight minutes and that is 80% of his one-rep max. Now, how that's translated was his ability to then hold six squats per kilogram on a bike for long periods of time which is sort of the holy grail metric of cyclists.

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So we're opening new doors here that hadn't been fully explored partly because of the assumptions in the old school of training, partly because they didn't work when you were just a sugar burner. You know what I mean? When you're just a sugar burner, there's only there's a finite amount of things that you can do in your training that will advance the plot. That will move the needle if you will. Some of those go back to how well do I manage glycogen, how much carbohydrate am I consuming because once I'm out of carbohydrate I am screwed.

The new paradigm is well, how well can I burn fats? So I never have to think about really managing carbohydrate other than I'm just going to know where my top end is and how hard I can go and still be burning 85% to 90% fat in these events where everyone else around me is burning 50% fat and 50% carbohydrate and they are going to deplete themselves much sooner than I will and your brain is going to shut down because they're only dependent on glucose. They cannot use ketones. They haven't built the metabolic machinery so when their brain runs out of glucose that's when I take off and win the race.

Robb Wolf: Got you. Got you. Mark, I've got to ask you more about the maximum sustained power workouts. This was one of the most exciting parts of a book for me. I have been doing a lot more Brazilian jiu-jitsu so my time in the gym doing strengthening conditioning has been less just because of time demands and then also I enjoyed doing other stuff so much more than being the gym and it's hard to go in there and do anything.

What I've been doing with that is, I use your 80% of the one-rep max and then I've just been topping the total reps out at about 20 to 25 total reps. But it sounds like -- because it's kind of out of this Prilepin chart type stuff and then like if I'm able to get like five sets of five with pretty minimal rest and I'll up the weight and then it will go five reps, four reps, 333 221 and then I'm done. What are your thoughts on that because it sounds like what you're doing is doing even more density training where we keep pushing this thing out until we get kind of like a soft failure on it? Like what are your thoughts on that?

Mark Sisson: Yeah. So soft failure is when you can't do one more rep with form, and you'll know when that is because it might be a couple of minutes in and you can't do one more rep with form and maybe if you waited two more minutes, you could but we're only doing that one exercise. So we're not - it's not like we're, that's part of an hour workout that includes a bunch of upper body stuff and we're just doing that one exercise and again, it's kind of difficult for people who are in the extra credit training mode...

Robb Wolf: Right, right.

Mark Sisson: Right, so okay, it's like people who do Tabatas and do eight of them. You know eight set of Tabatas is just like, dude the whole point Tabatas exist is because you only had to do one, maybe two sets of four minutes to get the benefits of 20 or 30 minutes. If you do an eight sets Tabatas then you'll probably not doing them well enough. You're cheating yourself on each single set.

Well, on this since we're going for maximum sustained power, and we're looking at aerobic power, we do want to pull it out there into 5, 10 maybe 8 minutes. Now, let's just say arbitrarily you say well, whenever I stop at seven minutes, I'll just go back and up the weight and I'll start over again from a new weight but you're really working on this ability to sustain power over time, and part of that is the ability to recover in between so you're simulating -- it's like in the old CrossFit days, Fight Gone Bad was created to simulate a fight, right?

Robb Wolf: Right, right.

Mark Sisson: And so when you're cycling, you go, okay, so a hill climb isn't one or the two minutes it's sometimes 10 or 15 minutes or more. I got to sustain power over that hill so I'm going plot the strategy so I'm loading these muscles up for 8 or 10 minutes. That way I know that those fibers -- I'm recruiting those fibers deeper and deeper. I'm building power in there. I know that I've created the metabolic that the fuel supply for them but the reality is, I still have to train the power. I still have to train them to be strong and to move my body through space over time with some consistency and the regularity over periods of hours in the case of this cyclist.

**[0:35:03]**

That's a key. I sort of pick one or maybe two of those exercises and the intent is to load, load, load. But don't hurt yourself and you'll know when that is and just walk away and say okay, well that was easy. That wasn't easy. It was fucking difficult but it was 8, sort of 10 minutes.

Robb Wolf: Right, now I think that's great so if with the Brazilian jiu-jitsu, most of my time rounds are five minute but occasionally we'll do some 10-minute rounds but could you make an argument then that the bulk of my stuff should maybe be five-minute time indexing or maybe six minutes to train to be adopted for a little bit longer than the bulk of my rounds and....

Mark Sisson: I think that's a great place to start and like everything you and I have talked about for the last 10 years or more, this ultimately becomes an experimental one. So I'll give you a template, right, and then based on your particular, the state of your health right now, your goals and all these other things within that template you go -- I know enough about this having read the book that I'm going to create this plan over the next couple of weeks that involves five to six minutes of intense loading with recovery in between, enough recovery in between to be able to this.

But how this came about was my friend Jack Devore who is a great cyclist, an awesome coach that trains Olympic athletes now in his gym in west LA. He realized early on that when he was getting older and he wasn't able to keep up with the young bucks lifting the weights. He needed some other metric to use and he realized that by doing this he can actually -- if you added up the number of repetitions by the amount of weight in a workout, he did more work in that amount of time than any of the other guys would do on their five, four, three, two, one sets or whatever.

And maybe they were moving on to something else but he was still within that particular realm, he was doubling the amount of force. Doubling the

amount of work that was done in that period of time and realized well that's this is all we're trying to do when we cause a muscle to adapt is to increase the amount of strain on it, the amount of stress on it so that it ups and gets stronger. If that's a way to do that, that's a little bit more comfortable and may take a little bit more time for that set, but if all you're doing is a one set, then that's the more efficient way of training maximum sustained power.

Robb Wolf:

Wow, I like it. I've been doing usually a lower body movement and then a press and a pulling movement. So I've actually been doing three movements in these sessions, but I only lift twice a week. So it's like a front squat, a standing press and like a bent row or deadlift, a weighted push up and a chin or something like that. So I'll do one exercise, finish it, give myself a short break, do the next, do the next. The whole session is about 20 minutes. Does that seem like a good way to do it or would you split, split those up and maybe do one exercise a day?

Mark Sisson:

Now so I wouldn't do one day because here's the thing. We're taking component apart and we're building an engine. So you need a block and you need pistons and carburetor and you needed all these different aspects to create a powerful engine using the automobile metaphor. So if you're going into the gym everyday, then there are other parts of your repertoire that you're not taking advantage or maximizing.

The other thing, the way to look at this is like we say once a week is all you need to do here. You're training specifically for an event that you want to excel at. Once a week is all you need to do because you're going to be bringing in these other components. You're going to be bringing in the low anaerobic strategy to build a base. Also that you're going to be doing high-intensity of intervals. We're talking about sprints and we talked in the book about in the old days of marathoning, you might break the intervals down into what appear to be a legitimate and logical subset of the event that you're doing.

So I used to do mile repeats as a marathon or half mile intervals, but I never did 100 or I never did 200 because it was -- I thought well that's a sprinter's workout, that's not my work and I'll never be going that fast. Well, we shifted on that again and we say well, maybe there's a reason that maybe look at better results going all out for 20 seconds than if you kind of parse to workout into or I'll go in 92% for a minute and a half. We have some very high intensity all out max heart rate type things. And again they're based on max heart rates not on -- the good thing about max heart rate is you don't have to measure it.

Robb Wolf: You know it.

Mark Sisson: You're there. You don't have to keep yourself honest there. So we're building all these component parts together so that let's say you have a day of sprinting. You do it once a week that's all you need to do because the adaptations are going to take place over the next 72 hours. They're not going to take place over night and you don't want to mess with the signaling that you've given the genes.

**[0:40:30]**

So if you go to do something at the gym every day, you get into this I think a routine where you're not maximizing the utility of the workouts. I don't go the gym necessarily to -- because I love to go the gym. I go there to do the work and I want to get out of there as soon as possible. I want to have a sort of what Ferris says MED, the minimum effective dose and that's what we're looking at here.

So we say you go to gym once a week, do those very select items. Now, if you want to go back to the gym and work on your biceps and do curls for the girls and work on a square upper back or whatever for body building purposes, go ahead and do that. That's not going to cost you anything, but that's not contributing to your training for the endurances of event that were talking about training for, whether it could be a Spartan race or it could be marathon triathlon, swim race, cycling race, century ride, whatever.

Robb Wolf: Got you. That's great. So I could get by with just one day a week like a squat, press, a pull and then maybe the next week, do a deadlift, vertical press, vertical pull instead of the horizontal press, horizontal pull and maybe bounce back and forth between...

Mark Sisson: I'd love it. I'd like to see you try that, yeah

Robb Wolf: Okay.

Mark Sisson: I mean, as I've gotten older, I know that I can't do anything more frequently than once every 4 days in the gym. I just can't. I don't recover fast and often, it's like, wow, I want to feel stronger when I go to the gym not -- I don't want to feel...

Robb Wolf: Beat down, yeah.

Mark Sisson: Yeah, exactly, I don't want to feel the after effects of the workout I did two days earlier or three days earlier.

Robb Wolf: Right, no, that's great and I've been doing a very light session on Wednesdays and I have your session on the weekends because it's further away from my grappling days. So then if I could pare that down to one day and then just throw one of the kids in a backpack and go for a walk or something as a recovery that seems.

Mark Sisson: But just the other thing so that's what we talked about also in the book is that, is it throwing the kid in the backpack and going for a walk? That counts man. That is right. That's legitimate training and by the way, you're spending quality time with your family.

Robb Wolf: Details, details.

Mark Sisson: You're out in nature and presumably, you're having fun. So all these things that we sort of assume, well, if I'm going to train for this, I got to struggle and suffer and sacrifice and give up and affect my work productivity and my family life. We're arguing, no, there's a way to orchestrate this where you can have it all, where you can have fun doing it. You can play and we talked a lot about the benefits of play. I mean, I think you know that I go for a long paddle at least once a week and I'm out there for an hour to two hours paddling. I know exactly where my heart rate is. I'm getting a great workout and by the way, even though it's an upper body, most in the upper body workout is still benefiting me for any sort of 5K run I might want to do. It all counts. I know that once a week, I play Ultimate Frisbee. We're going to get you out here for that game too by the way.

Robb Wolf: You will crash me with that, but I'm gamed it and I have no shame. I'll get smashed, but yeah, that sounds great.

Mark Sisson: But that's having fun. Playing is an integral part of your training and if we want to take the ancestral model, we look at the famous videos of the Kung Bushman going out to get the beast, the wilder beast, the Kudu or whatever they're looking for and we see them covering 7 miles in the heat that day and we go, oh my god. Those guys are really fit. How do they train for that? Dude, they don't train for it. They live. Their life trains them for that. They lift heavy things. They move around a lot in a low level of activity back at camp. They spend quality rest. They play. They sprint once in a while for their lives and all of that which is just a part of life prepares them for the hunt. So it's kind of funny to look at people and go well, how do these guys train? Well they don't train, they live.

Robb Wolf: Right, right, now I love it. Mark, shifting back to the nutrition a bit, we've learned a ton about the gut microbiome clearly and a super important



facet of human health. Personally, I feel much better at the lower end of the carbohydrate intake spectrum. I did a 23andme analysis and it put me at 300% greater likelihood of developing type II diabetes than average. Both of my parents developed type II diabetes in their 40s in very poor lifestyle but I come from the shallow end to the genetic gene pull on that but there's a lot of and a nice way to say it I guess is concerned around gut health and low carb eating

[0:45:31]

I'm perplexed on that because I've fiddled around with doing more fermentable carbohydrates and I've got to be honest. I feel like shit from it like I'm gassy and bloaty and I get foggy headed again and get carbohydrate swings. It feels a lot like my vegan days where the folks were really promoting this stuff, they're just adamant that I just need to hang with it longer. There's some secret sauce that I am not quite doing yet, whereas if I just kind of eat lower carb, I don't have any of those problems, but like is my weeny going to fall off from doing a long-term ketogenic diet to support my cognition and health and all that stuff, like where are you at on that?

Mark Sisson:

So far, I'm right with you. I do better on a low-carb strategy. I feel that for me, a low-carb strategy – by the way, I'm rarely in ketosis, but I'm always 80 to 110, 120 grams of carbs a day. Almost all that comes from vegetables, which I am quite confident, are supplying plenty of fiber for my gut bugs. So I'm not really concerned about my own gut biome with regard to substrate for those little guys to live on and thrive on. I do make a probiotic that I take. The Primal Probiotic formula is a soya-based formula. It's got spore formers in it that aren't necessary even prevalent in your gut in large numbers, but they talk to the other ones. They sort of help up regulate and down regulate the much more prevalent ones.

Robb Wolf:

You have to tell everybody your story of your wife when you tested this thing out.

Mark Sisson:

Yeah. So this stuff is so powerful. Normally, we talk about CFUs colony forming units and my own probiotic had 30 billion colony forming units per capsule and when I was doing the research on this and I saw how powerful these spore forming units were. I thought well, I'm going to make this because they're like 100 times more powerful than standard lactobacillus formulas and Bifidus formulas. I only put like I think 6 billion colony forming units per capsule and then I started to think holy crap, this might even be too potent, I don't know. So the first shipment came in and I told my wife because I'm taking capsules tonight. If I don't wake up, just make sure that we don't sell this. Well, that was 2 years ago and hundreds of thousands of user experiences later, people are just raving

about it. So it was the right decision, but it's always kind of interesting when you look at how potent some of these strains are over other strains.

But where I was going with that is that I still think that the gut biome – you and I started talking about this 3 years ago at one of the Paleo FX events, how this the new big thing, and it's still the new big thing. We still haven't even scratched the surface on how complex this gut biome thing is. So until we do, I'm sitting here going well, as long as I feel good, as long as I'm pretty confident that I'm getting enough fiber in the form of vegetables because I mostly eat vegetables for my carbohydrate sources. I feel quite confident that -- and by the way, it's so funny you look at what is a turd. It's basically bacteria turnover.

Robb Wolf: Right.

Mark Sisson: It shouldn't be fiber. You should not be shooting out the fiber, you know, what I mean, for lack of a better concept. Basically, it's just dead bacteria, good and bad that are passing through your systems. So a lot of this analysis of the gut biome and emphasis on 100 grams of fiber a day or whenever it is, I think it's a little bit misplaced. There a lot of people who are vegan or vegetarian who are just not having well-formed turds because you're just putting so much fiber through their systems. It's unnecessary. It's almost like being clear, right, the same concept, right, like people say well, if I'm not being clear, I'm not hungry, I mean, I'm not healthy. Well, I think you're over hydrated if you're peeing clear all the time.

Robb Wolf: Right, right, no, I love it. Peter Attia has been making the rounds on some podcasts and he made a really interesting point on this gut biome topic which was -- he's like I knew that there is importance stuff here and if I misquote this, huge apologies, but the basic thing was I knew there's huge importance here. In his opinion, he didn't know really what to make of it and he really didn't know what to do from a clinical perspective.

Like I have a patient, they have problems. Like in very limited circumstances, we'll find some small intestinal bacterial overgrowth or different things like that and then beyond that, he has just been bit of a lost to know what else to do. If the blood lipids improved, if energy and cognition improves, are we really destroying like the mucin layer in the gut, are we increasing endotoxin translocation into the system and whatnot? It's interesting. I think we'll know more about this 5 years from now than what we've learned in the last 50 years, but man, I gave it the

old college go and potatoes and white rice and beans and it sucked. It just sucks.

**[0:50:53]**

Mark Sisson:

The potatoes hack is another sort of interesting example of how we took an idea that as Attia has just noted. We know it's important, but we don't – we haven't really figured out what makes it important, how it's important, what we need to do to fix it and so the potato hack was an example of people, oh well this is how you fix it. You do 3 days of potato starch and blah, blah, blah, Well, a lot of people got into some serious issues with the potato starch because it wasn't right for them. Really, it comes down to, there's some 3000 different strains of bacteria that are going to be found and in various amounts and relative amounts in every body, Effects are different in every body, but I think what's interesting to me is you'll find similarities among or between husband and wife. So within a family, there'll be similarities. Well, you share saliva. You share other fluids. That's probably going to...

Robb Wolf:

And float some things.

Mark Sisson:

Yeah. So that will have an effect. The idea that people with C. difficile or with certain serious gut issues can be cured with a fecal transplant just intrigues the hell out of me. Talk about low tech, right?

Robb Wolf:

As Jeff leads said the shit milk shake and you're there, yeah.

Mark Sisson:

Yeah, exactly. So that's been an area of interest and intrigue for me for a long time. But meanwhile, I go back to my basic desire for everyone of my readers, which is as long as you feel good and as long as you are making intuitive decisions that are based on some amount of knowledge of yourself and some amount of reflection of the current science, then feel good about life and make those choices without guilt and move on and if something needs correcting, then correct it, but don't beat yourself up because you're not doing this or you read this and you feel like you can't make that correction in your life.

Life is here to be enjoyed. I changed the tag line of Primal Blueprint 2 years ago to live awesome and I really want for everybody to do that, to live an awesome life, to eat awesome food. Never choke anything down just because it's supposed to be healthy for you. I want to enjoy every bite of food I eat. I want to enjoy my workouts as much as possible. I want to spend time with my family. I want to extract the greatest pleasure and then fulfillment out of every moment possible and that's really what Mark's Daily Apple is all about. It's finding different ways in

which we can do that and different ways to educate people so that when they make those choices, they feel good about those choices.

Robb Wolf: All right. I love it. You've just been an incredible mentor for me, for millions of people. Really, really love your work Mark and I think I've mentioned this at a PaleoFX, but even in the risk assessment work that I've been hammering away at for an inordinate amount of time, it was really your input and advice that got me focused on bringing that project to fruition. I was really casting about for what the heck I was going to do, where my effort is going to be best spent. So I really appreciate all the work that you've done, the friendship that you've provided for me and the insights into what the heck, where I could move the lever most effectively and so thank you for all that.

Mark Sisson: Well, thank you and I most appreciate it and it's mutual. As you know, I have the greatest amount of respect for you. I consider you a great friend. I feel strong and confident that the two of us together can actually move the needle and change the world.

Robb Wolf: I think we're doing it. I think we're doing it. Yeah, we'll see. We'll revisit this next podcast 5 years from now and see what we're out with that, but Mark, just remind folks where they can track you down. I know everybody knows about your stuff, but just in case, they've been living under a rock and don't know where to find you. Where can they track you down?

Mark Sisson: Sure, [marksdailyapple.com](http://marksdailyapple.com) is the blog. [Primalblueprint.com](http://Primalblueprint.com) is the site where we have books and some of the supplements and foods and the certification program. The books are available on Amazon and at Finner Bookstores everywhere.

Robb Wolf: Cool and then Primal Endurance is available, print e-book and audio book currently, yes?

Mark Sisson: All three and all three are doing pretty well on the charts, I might add.

Robb Wolf: Yes it is, yes it is, very cool. Well Mark, thank you again for taking the time to come on the show today and we'll see each other next at PaleoFX?

Mark Sisson: Looking forward to that man.

Robb Wolf: Okay, cool, awesome Mark. Take care. I'll talk to you soon.

**[0:55:38]**

**End of Audio.**