

EPISODE 213

[INTRODUCTION]

[00:00:10] AVH: Welcome everybody to the podcast. I would ask you how you're doing but you can't answer me which sucks so I'm just going to assume that you're doing awesome and hope that you're doing awesome. But, if you're looking for pick me up, I do have a good idea for you actually. Have you ever thought, man, my day would just be dramatically improved if I had a big box of paleo snacks? And treats like stuff from Primal Kitchen and Taza Chocolate and for Sigmatic and Epic and Paleo Valley, et cetera, I know I'm always thinking that because I'm always in the mood for paleo snacks and that's what paleo magazine is going to do for you guys.

If you are looking to subscribe to the magazine, if you haven't done so yet and you choose the premium insider subscription, you will get a year's worth of magazines delivered to your door. You also get digital access to every issue ever which is pretty incredible, going all the way back to 2011.

We send you a box of goodies as a welcome and a thank you, it has a ton of stuff in it from the companies I mentioned as well as others and is well worth the value when you consider the sheer volume of recipes, workout ideas, fun reading, learning, and most importantly, snacks, you'll be getting, you know how I feel about snacks.

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All right, on to today's topic which is so good. I know I say that pretty much every week but I mean it, every time I say it, I mean it. Today, we are chatting with one of the most beloved figures in the paleo world, the paleo mom, Dr. Sarah Ballantyne.

She has a new book called *Paleo Principles* which has got to be the most comprehensive paleo guide book ever, packed with scientific evidence that supports health benefits of the paleo template and it has visual guides and tips, meal plans. It has more than 200 recipes and that's just like a small portion of the book. It's really an impressive, incredible resource and everybody's talking about it for good reason.

You know, this is just one girl's opinion but I really think it's like, it may be kind of the first and last stop that most of us need, to learn about our bodies, how we react to food and exercise and stress and sleep and it talks from a really kind of holistic high level perspective. As well as drilling down into really specific questions about macro nutrients and our gut microbiome and how our mitochondria reacts to our lifestyles. How to be paleo while pregnant. How to manage inflammation, you get the point, I could go on and on and this thing doubles as a murder weapon because the book weighs about 10 pound, it's amazing.

Anyway, in this podcast, I get to talk to Dr. Ballantyne and we talk a lot about macronutrient balance which I think is a very important topic and it's good to kind of catch this other side of the equation in light of the really huge problems of keto and high fat, low carb diets, we're seeing these days.

That's a really interesting important conversation that we have and we talk a lot about all the different roles that insulin plays in our body, we talk about how to deal with even recognized inflammation, that was a personal question I had and honestly, that's just a start. We actually begin the interview about halfway through kind of an offline conversation about coffee and caffeine.

We hadn't even really started the interview yet but I thought it was interesting enough to leave in so that's why you'll kind of hear us in the middle of a conversation, I'm not introducing her like I normally do but everyone who knows Dr. Ballantyne knows that she's just such a genuine and passionate and smart person who has, honestly, something knowledgeable to say about every single topic including coffee. That's why we're starting there.

That's it, I hope you enjoy my interview with Dr. Sarah Ballantyne.

[INTERVIEW]

[0:04:10.1] SB: Coca beans instead of coffee beans and I mean, that still does have a little bit of caffeine, like I have to work hard to, because I'm the same, my beverage of choice is anything with the caffeine flavor. Like, coffee, black tea, green tea, those are all delicious options and mint tea and chamomile just don't, it's not the same thing, it's just, it doesn't cut it. I have like very measured like I have one cup of coffee in the morning and then I have two cups of green tea sort of later and I have to cut it off at noon.

I've done a lot of – I used to drink way too much. Like six cups of coffee a day, there's no problem with that, right? I've had to also reign that in and I think I have it dialed in to the point now where I get to enjoy my delicious comfort in a cup hot beverages but I still sleep really well but I'm the same in the sense that slow caffeine metabolizer gene runs in my family and it's better because it has like lower health risk than the fast caffeine metabolizer.

But it sucks in the sense that we have, more sensitive in terms of sleep problems and stuff like that.

[0:05:24.2] AVH: I mean, I guess, like you said, it's just about knowing yourself, right? I'll never forget, I was like a really late adopter with coffee and it wasn't until I moved classic to New York City in like my mid 20s, I just – everybody's drinking coffee and I felt left out so I was like all right, maybe I should try this. I must be missing out on something. I'll never forget it was like one kind of warm summer and I had just really started just drinking coffee and I was drinking ice coffees and I had like one big ice coffee a day for like a week straight and by the end of it, one day, I was like am I having a panic attack? Then I was like.

No, it's just that I've been drinking so much caffeine and so I feel like, obviously I cut back but it takes some experimentation, right? Like you said, I can't drink anything after like lunch time or I'm screwed for sleep. I just need to know what's that sweet spot because the last thing I need is just like, you know, that kind of jittery anxiety feeling because I'm prone to being that anyway.

Anyway, I don't need coffee to get me out of bed in the morning so I do it just because I love it. Yeah, kind of finding what works and then there's like all the health benefits of coffee that's

coming out and then green tea especially and black tea and it's like, there's some good reasons to drink that stuff too besides just that it tastes nice.

[0:06:35.1] SB: What's interesting about coffee though is that there's a disparity in terms of research results, we've got this collection of studies showing that moderate coffee consumption is beneficial but there is actually a collection of studies showing increased health risk and increased inflammatory markers with moderate regular coffee consumption so with coffee, the data's actually mixed and weirdly, it's not mixed with like green and black tea.

I totally use all of the good studies to rationalize my cup of coffee a day and totally use all of the tea studies to say and that's why I should switch to green tea afterwards because why not. I started drinking coffee daily when I was 14. I was going to high school on the school bus with a travel mug of coffee.

[0:07:21.1] AVH: Nice.

[0:07:22.8] SB: It was like a power struggle between my parents as they ended up, their last couple of years before divorce. And my dad would give me coffee and my mom would like freak out that I was drinking coffee and I really liked coffee so I sided with my dad on that one so you know, it's awesome.

[0:07:36.7] AVH: It's like, there are worst things that you could be doing at 14, right? Than drinking coffee.

[0:07:41.9] SB: I mean, I was a good student, I was a super nerd even way back then. I pretty much stayed out of trouble and with Hashimoto's Thyroiditis. Like, I was tired all the time. Coffee was what got me out of bed in the morning. Yeah. Basically means I have a very long standing love hate relationship with my coffee.

[0:07:58.1] AVH: Got it. What do you think about, speaking of these studies, what do you think about this recent thing in California now where I don't know, you have to put like, yeah.

[0:08:08.1] SB: Six to five morning?

[0:08:09.0] AVH: Yeah.

[0:08:09.6] SB: I mean, I would love to go dig into some details about how much acrylamide actually forms in the roasting process. It's probably, we have this disparity of studies with coffee, right? We have these studies showing like decreased risk of cardiovascular disease and then we have these compare and contrast studies like there's decreased risk of some cancers, increased risk of other cancers and there's some interesting research that's trying to dig in to like what is in coffee that's protective, versus what is in coffee that is maybe detrimental.

When you look at some of these carcinogenic byproducts of the roasting process that those could be what this increased risk of health problems could be attributed to. What's really interesting is, it's probably not the caffeine.

A lot of studies that look at decaf actually show – because when you decaffeinate coffee, you actually strip out a lot of antioxidant like the caffeic acid and I think coffee has camphol in it. A lot of the antioxidant phytochemicals get stripped out as well and then you lose a lot of the health benefits with decaf.

Decaf is not a better choice like it would be better to go to a tea at that point rather than decaf coffee. I mean, I think generally, the Prop 65 warnings trigger on a lot of the time they trigger on too low of an amount of some of these compounds because they're triggering sometimes on amounts that are absolutely naturally occurring.

It's like, it's a difference when it's like, it's added through processing versus naturally occurring and it misses the piece of the context, right? That small amount of acrylamide may increase risk of cancer if you have a lot of other cancer risk factors. If you're also a smoker, if you have a nutrient deficient diet, if you're not eating very many vegetables, right? If you're not doing all of these cancer protective things.

Generally, I think Prop 65 and just increasing people's awareness of environmental toxins is really awesome. I kind of like, I see where the coffee companies are coming from in terms of not wanting to put Prop 65 warnings on every single cup.

I also think that generally, Prop 65 is really awesome but I would love to be able to see them differentiate between naturally occurring - like spinach. Spinach should carry a Prop 65 warning because it's naturally high in lead.

I would love for people to say like, this is a, it's different, right? It's different that spinach is naturally high in lead versus lead that's coming from 1970s paint or you know, manufacturing air pollution, right? I'd love to be able to see them sort of figure out how to differentiate between naturally occurring, especially in otherwise health promoting food versus an environmental toxin that is introduced through human activity. Do you know what I mean?

[0:11:15.6] AVH: Yeah, I mean, I think a lot of these studies and a lot of the information that where we have access to these days, so much of it again boils down to context, right? Which is something that I really want to talk to you a lot about as we get into talking about your book and some of it I'd like specific nutrition questions I have.

Actually, we've been recording this whole time just so you know, just because I pressed go and I – we'll introduce you.

[0:11:38.5] SB: That's why I didn't drop any F-bombs, I have to always assume.

[0:11:42.7] AVH: Well, or not, who really cares? I mean, anyway. We'll do the intro for you like off – separately so we can just kind of get into it which I'm really excited to do. Since we're already nine minutes into this, I just wanted to thank you so much for taking the time and to talk to me today and also to talk about your book which everybody is talking about *Paleo Principles* like, it's a big deal. Literally and figuratively.

It's amazing. I've been reading it for about the past week.

[0:12:11.9] SB: What? You're not done already?

[0:12:13.6] AVH: I know, I'm working on it.

[0:12:14.8] SB: It's like a two beach read

[0:12:16.8] AVH: Right. I'm reading like a chapter a night and I'm loving it because I've got a little bit of nerd in me too and I love to learn. One of the things that I do in addition to this amazing gig I have as a podcast host is I do some primal health coaching and I help people just kind of help guide and support people to finding, you know, their own personal ideal sort of healthy lifestyle and I feel like this book is just such an amazing resource because every question I have, even questions I didn't know I had, the answers are in this book.

It's so thorough and you know, it also doubles as a piece of workout equipment so I can do my squats with it while I have it in my hand.

[0:12:55.2] SB: It's excellent to put it on your shoulders and just do like a two minute plank hold.

[0:12:59.7] AVH: Yeah, amazing. It's so great.

One of the questions I have for you before we get into like some specific nutrition questions I have is, how long did it take you to put this together and how do you even begin to organize a resource of this magnitude? What are the process behind putting something like this together?

[0:13:20.3] SB: This book was about 14 months from pitching to my publisher to publication. Which is sort of a similar timeframe to *The Paleo Approach* which is a little bit more of a deeper dive into immune system function and then a little bit less of a sort of broad overview of everything that we know about healthy diet and lifestyle choices.

It basically - I had the advantage of starting this book with a tremendous amount of research and writing under my belt because I've been writing on the website about these topics for years already by the time I started pulling this together. So I started with – it's my typical process when I write a book, I started with a 24 page long detailed outline and as I write, I shift, so there were a lot of chapters end up getting merged, things that shifted around placement.

The outline was not that far away from like, if you just look at the table of contents now from what the book looks like. Then, honestly it was like, just keep swimming, but it was, I would

carve out as many hours a day as I could do to sitting and writing and researching. I had a research assistant for this book which was super useful so I could say, you know, “Hey, I need to expand on this particular topic, it’s not something I know a ton about. Can you do a dive through the literature and find the best, you know, summary papers for me to look at, do a little point form summary of the state of research in this particular subfield.”

And that expedited a lot of that writing compared to previous books where I would spend 40 hours doing research on one tiny little topic to write three paragraphs. That sometimes, the breakdown in terms of effort and reward.

With this one, it became obvious really early on that it was going to be a beast. But I pitched this to my publisher as wanting to write sort of the definitive guidebook. Up until this book, we didn’t really – in our community have a book that went into this level of detail in terms of the modern science behind what foods to eat, what foods to avoid and why certain lifestyle factors are so important to prioritize. We had bits and pieces in different books, we had a lot more evolutionary biology rationale in books compared to contemporary, physiology and cell molecular biology.

I really wanted to write a book that in many ways which sort of re-center the movement because I think as we grow, what is sort of like standard paleo, the lines around that have become crazy blurry. So I kind of wanted a chance to sort of like, “Hey, state of the union guys, here’s what we really know about optimal diet,” and then I also wanted to provide people with their own ammunition for defending this way of that eating and living to their relative who shows them some media article about why paleo will give you cancer.

Or their doctor who doesn’t think they should be doing this and they should be eating low fat instead. I really wanted to give people that – just that amount of information but also, I’m a really strong believer in providing a broad scientific education behind choices to help inform them rather than distilling things to a set of rules.

I think we’ve seen over the last sort of century-ish of dietary guidelines that rules don’t work. Humans aren’t huge rule followers by nature, we tend to want to find the ways to cheat things, you know, I will often, if I’m doing an event, I’m like, “Okay, raise your hand if you always drive

the speed limit.” No one’s hand goes up. I was like, “So, you know, raise your hand if you cheat on your diet,” right?

Everybody’s hand goes up and so, I wanted to kind of get away from rules because we’re always looking for the ways to break those rules and instead, move towards providing a really broad scientific education behind the better choices and by doing that, you kind of let go of this idea of like, you have to be perfect all the time.

And instead, you empower people with the knowledge to make a better choice more often but you also give them the knowledge that they need to self-experiment and really tinker and figure out their own individual response to foods.

Because there’s a lot of things within the foods within the paleo diet that should traditionally be considered paleo that actually don’t work for a lot of people. There’s some foods that have traditionally been considered not paleo that do work for a lot of people. And so I wanted to kind of leave that paleo dogma behind and instead, move to a framework that helps people really understand their own bodies and informs their choices as opposed to drive 45 miles an hour.

[0:18:28.0] AVH: Yeah, I really appreciate that, you’re saying, you know, getting away from this dogmatic approach because, I think that’s something that I think Paleo Magazine and I think this podcast were really trying to do is you know, this approach, this personalized nutrition approach.

As you said, you’re providing some scientific information that’s not emotionally based, it’s not rules based, it’s, here’s the science and then take that and empower yourself with it and figure out what works for you personally.

That’s not going to look the same for everybody and I think that’s really important for people to understand that and that’s why this book is so important because it just provides the information for you to read and understand and absorb and then take it and work with what you’ve got. Which I think is really important.

But one question that I had too with the sheer volume of science backed information that’s in this book.

I have a little bit of experience with publishing so I kind of understand this frustration but when you're working with something this big and you're working with studies and research, often times, you know, in the timeline of getting things edited and put together and all that stuff, I mean, there's new research constantly coming out, stuff's old, references are old. How do you deal with that?

[0:19:34.6] SB: I mean, I was literally making edits to the designed book two days before it went to print because a new study came out. I mean, what I try to do, I don't put a ton of stock into individual studies with the exception of you know, there are landmarks to these, they're incredibly well designed that you know, it help completely reform our ideal about concepts.

There are often studies that really do have that level of importance. I tend to look more at the consensus within a field and the collection of scientific research surrounding a topic and when you take that sort of broader approach you take that step back and look at where does most of the research point in this regard, it's a little bit more robust in terms of those conclusions standing the test of time. And it's a little bit less likely that some, one study will come around and you know, completely flip everything on its head.

I mean, I do, I find studies that challenge a lot of our conclusions in the paleo community, really fascinating. And I'm not a person who just misses science just because it doesn't conform to the conclusions that I've drawn based on prior experience or science that I've read before. I'm a person who looks at new and contradictory information and tries to understand the, does this, is this context dependent, is this – does this really alter –

Does this apply to a certain subset of people, you know, I'm much more interested in trying to integrate that information rather than dismiss it because you know, find whatever flaw in methodology means that this paper is you know, obviously something that we just won't put any stock into.

I'd far rather take a deep dive into that and try to understand how it fits into this bigger picture. One of the things that I've tried to do with *Paleo Principles* is not get re ally focused in on here's my message and I'm going to find the science that supports it.

But rather, here is what science tells us and here's the boundaries of current human knowledge. Based on what the majority of research in this field can tell us about this topic, this is what is actionable based on that, here's what we don't know yet, here's what could change with new information and I think that when we can present dietary guidelines and guidelines for lifestyle choices, in the context of current human understanding of you know, how diet and lifestyle impacts human health at, you know, from the broad, you know, biological systems level, all the way to the molecular level, when we can present that with the boundaries of current human knowledge, it also gives us the room to add on and adapt.

And I think it's one of the challenges that the paleo diet has faced over the last few years as new research has come out and as new thought processes have been incorporated into our communities. We've had other voices go. Hang on, let's talk about traditionally prepared legumes or potatoes or white rice, you know, let's talk about these foods, let's talk about grass fed dairy, you know, where the lines between paleo and primal have really blurred.

When that started happening, there is a lot of push back against any kind of change to the framework. What we have found over the last few years is as we talk about the science behind why we're reevaluating the merits of this particular food and who it might work for and who it might not. There's just been an easier time in having people accept that you know, hey, maybe green beans can be paleo, there was a time where a green bean recipe or recipe that used white potatoes would incite an internet riot because people go, "That's not paleo!"

It still does, right? There still is a sort of purist section of our community who really follows sort of original paleo guidelines. But you have to remember that really original paleo guidelines said that diet coke and canola oil were fine. You know, we've really tried to continue to evolve the template to reflect our most up to date understanding.

One of the things that I really tried to do with *Paleo Principles* is be very upfront with the limits of human knowledge and also, respect the area where bio individuality is probably the dominant determinant of whether or not a food is going to work for you rather than just nutrient density or the presence of inflammatory compounds.

Because there is a huge collection of foods that you know, there's pros and cons and whether or not it works for you is really going to depend on your genetics and your particular health situation. Your epigenetics, your gut microbiome, your hormone environment, how robust your immune system's working.

Really trying to parse that out and I think that when we present paleo template, primal ancestral templates in this way, it allows us to take that new scientific paper and go, hang on, we've got new information, let's incorporate this into our understanding.

Yeah, that probably means in a couple of years we'll have to do a revised edition.

[0:25:02.5] AVH: You're not afraid of a little hard work though, you'll be ready for that.

[0:25:06.1] SB: It's fine.

[0:25:07.1] AVH: Yeah. I mean, again, I think what you know – listening to you talking about this again, it makes me think that it's all – it's so much about context, it's the context of our understanding, it's the context of our individual situation and where we are health wise and that matters.

It's not just – that's why those cut and dried rules can't always work because it's – they're so much context that's involved.

[0:25:29.9] SB: There's still sort of underlying foundational principles that we know has to apply in order for a diet to be a health promoting diet. That's the other aspect of this, is to, you'd be really upfront about the boundaries of our knowledge and where bio individuality comes into play and how to self-experiment to figure out what's optimal for you but then there's still these things that we know are universally true for everybody.

You know, the best example is nutrient sufficiency. If you are deficient in any one nutrient, that is going to impede some biological process in your body and that's going to stop you from being as healthy as you can be. We know that getting sufficient quantities of all essential and

nonessential nutrients from our diet is a prerequisite for that diet to be a health promoting diet over the long term.

We've also got, while we've got all of this room for experimenting and you know, finding the flexibility and how our bodies respond to individual foods and tinkering with macronutrient ratios. We also have these sort of core concepts that we still have to keep in mind because a diet will only promote health over the long term if those things are there.

[0:26:46.4] AVH: Okay. This leads very well into my next question which is diving a little bit more into nutrition specifically and I still want to kind of approach this from sort of a higher level because it's impossible, if I was going to ask you all the questions I want to ask you about the book, we'd be here for months.

One of the questions that's, I think a really big one, maybe that's not being asked enough maybe in our community right now but one that I really wanted to talk to you about, is this idea of balanced macro nutrients because as you know, you know, keto, the whole keto thing, super low carb, carnivore diet, all of these things are gaining a lot of steam in the paleo community and I know I've interviewed quite a few keto advocates both therapeutic keto for certain diseases but also just, people who think that this is something that can be implemented, widespread and would be beneficial to people.

It does seem like you know, you mentioned earlier that we all kind still, it's like human nature to kind of want this quick fix and sort of a new, sexy, do this, everything's going to be okay and a lot of people are finding either success initially or just really excited about this idea but it seems to me and you can correct me if I'm wrong but you know, in reading your book that a sort of balanced, more balanced approach to macro nutrients may be at least a better starting point for most people. Can you kind of just get into that for me a little bit?

[0:28:08.6] SB: I would love to. This is actually something that I feel very passionately about and it doesn't come from my own health journey. Although having really broken my metabolism through long term low carbohydrate diet certainly got me started on diving into the research about this.

But there's many very compelling reasons to approach a diet with a balanced macro nutrient approach rather than – there's just so many other places to troubleshoot rather than manipulating macronutrients.

You know, let's start with hunter gatherers, we see hunter gatherers in almost all environments get fairly balanced macronutrient intake. They typically get about half of their calories from plants and about half of their calories from animals. It typically translates to between 20 and 50% of their calories from fat, 15 to 30% of their calories from protein and the rest from carbohydrates. And you know, again, we're sort of like, we look to these cultures as a starting place for understanding what an optimal human diet is.

When we dive into the literature in terms of understanding our biological responses. You know, we see that there's some really compelling reasons to get adequate protein, adequate fat and adequate carbohydrates. You know, I certainly don't advocate like "Woohoo, let's eat all the carbs, this is great, hyper corn syrup for everyone!"

You know, insulin resistance is a really problematic situation. High blood sugars, inflammatory, insulin by itself, high insulin levels in the blood by itself is inflammatory, their mechanisms of causing inflammation are different, therefore they're additive and having insulin resistance pretty much increases risk of every chronic illness.

It increases risk of not just promoting weight gain and increasing risk of diabetes and obesity but it increases risk of cardiovascular disease, of many forms of cancer, of many autoimmune diseases, of chronic kidney disease, of asthma, of allergies, of PCOS. Like it's – insulin resistance is bad.

Whenever I talk about why eating some carbs is good, kind of want to just start with this caveat of like, let's all agree, I'm not saying eat all the carbs, I'm saying that low carb approaches have limitations for long term health. One of those limitations is nutrient sufficiency.

Which I sort of already touched on but we know for example, that fiber, even though it's considered a nonessential nutrient is absolutely essential for health through its impact to the gut

microbiome, current mainstream recommendations are 25 grams a day for women and 30 to 38 grams a day for men. But the average American intake is eight grams of fiber a day or less.

Hunter gatherers consume anywhere between 40, 50 grams a day by some analysis, up to 200 grams of fiber a day. Depending on where they live and the exact percentage breakdown of plants versus animal foods in their diets. 50 grams a day, using like the types of food and the grocery store is nearly impossible.

You pretty much have to munch on those tough ends of the asparagus that you normally throw out all day in order to get that kind of fiber intake. No, it's a different, that's a different level of commitment to get that kind of fiber. But if you kind of look at USDA guidelines as a more achievable goal for fiber intake, it's really challenging to get that much fiber with a low carb approach and it's impossible to get that much fiber with a very low carb approach.

If you look at the vegetables that are the lowest sort of – like non-fiber carbohydrate to fiber ratio, spinach are pretty much tops that list. And you pretty much need to get, in order to hit your 25 grams of fiber, you would have to have 50 grams of total carbohydrates if you just ate spinach and it would equal the output 40 to 45 cups, about three pounds of spinach to be able to hit your basic fiber requirements in spinach.

That's really the only way that you could meet your fiber intake and have still fall into that low carbohydrate range. When you start looking at root vegetables for example, there's a higher non-fiber carbohydrate to fiber ratio but they're much more dense sources of carbohydrate.

Instead of 40 to 45 cups of spinach, you can eat about three cups of baked sweet potato to still get that 25 grams of fiber. But, you're all of a sudden looking at 150 grams of total carbohydrates. You know, 150 grams is considered moderate, some doctors would even consider it low.

It's still about half the average American intake or even a quarter, depending on which analysis you look at. We're still talking about moderate carbohydrate consumption. Whole food sources of carbohydrate, slow burning carbohydrates because we're looking at fruits and vegetables.

It does kind of automatically put carbohydrate intake into the hundred to 200 gram range. There's some other benefits that comes with this. There's nutrients that we get from animal foods that we can't get from plant foods and nutrients we get from plant foods that we can't get from animal foods.

Once we start balancing macronutrients and making sure that we have enough room for protein and carbohydrates and fat, right? You don't want to go all in on carbohydrates and not have enough fat because then you're not going to absorb your fat cellular vitamins.

You don't want to make it so that you're not getting sufficient protein because insufficient protein increases muscle wasting and has some pretty negative impacts on metabolism. This moderate 20 to 40% of each macronutrient tends to be provided we've got this whole food, nutrient dense framework underlying it, tends to give us a better opportunity to reach nutrient sufficiency with our diet.

There's this whole other side of it. In that insulin has some rules in human health that's not just about shoveling glucose into cells. We know that high blood glucose is bad, high blood insulin is bad. Insulin resistance is terrible and so we have this idea of like, well, if it's high, it's bad so we must want it to be zero and this gets to this human nature of we get very extremist sometimes in our approaches to things, right?

The body is almost always grey, there's almost always a U-shaped curve in terms of our response to things. You can think of it really simply in terms of nutrient deficiency, right? Being deficient in vitamin D or vitamin A or zinc deficiency, these have really enormous consequences for human health but if you supplement with too much of these nutrients,

You get zinc toxicity, vitamin D toxicity, vitamin A toxicity and that can also be life threatening. Too much vitamin D impacts bone strength. So you need vitamin D in order to make healthy bones but if you supplement with all the vitamin D and you have way too much vitamin D, your bone strength is going to be impacted as well. So everything the body generally wants in a happy medium range and insulin definitely falls into that category.

One of the things that I don't think is sufficiently communicated in our community is the rules that insulin have in other systems, that's sort of independent of energy balance. For example, insulin regulates skeletal muscle metabolism and it actually increases muscle protein synthesis and decreases protein degradation in muscle. So we see this effect in athletes who if you go to low carb, you increase muscle metabolism so you decrease the ability of muscle to health.

You increase break down of muscles, insulin is also important for transporting amino acids into muscle tissues. So having a little bit of insulin becomes really important and you see it's one of these interesting things because often, you see the same effects with a low carbohydrate or very low carbohydrate diet approach as you do with insulin resistance because physiologically, there's something really similar happening there, right?

So you have one where there's not enough insulin for that signaling to do its job and the other where the body can't respond to the insulin that's there. And so we see this in terms of muscle health and muscle building that some insulin is really, really beneficial to maintaining and continuing to grow healthy muscle tissue and insulin resistance is really, really bad. Insulin has a role in bone health. So it actually stimulates the activity of osteoblast which are the bone cells that actually help deposit bone tissue.

So we have this constant remodeling happening in our bones all the time osteoclast break bone down and osteoblast spilled it and insulin is actually a major stimulator of osteoblast activity which is why we see impacts on bone marrow density both in insulin resistance and diabetes and also ketogenic diets. So we see this decrease in bone marrow density or this increase in bone fragility. So you can measure that increase in hip fractures for example.

Insulin is important for thyroid function. So we know that this really active thyroid hormones T3 is sensitive to both carbohydrate and calorie intake. So if you drop carbohydrates or calories really low, your T3 will go down. And we see that in both of these extremes again, sorry, low carb diets, keto diets tank T3. Diabetes and insulin resistance also tank T3 and this is probably because insulin pretty dramatically stimulates an enzyme which is responsible for conversion of T4 to T3.

And actually the most type two, five prime deiodinase enzyme. It's the most active conversion enzyme that we have in our bodies. It's a thousand times more active than other forms of that enzyme. And it's this particular form of this enzyme we know is especially important in the pituitary gland and the neural tissues. It's especially important in our adaptation to things like cold and it converts the pro-hormone T4 into the active hormone T3.

It's increased with insulin, it's decreased with fasting. It's decreased with low carbohydrate diets and it's also decreased with insulin resistance. So we see it with type two diabetes and we see it whenever there is a lot of inflammation and endoplasmic reticulum stress in cells.

So we got this really important happy medium of insulin required for thyroid function. We have a really important happy medium of insulin required for immune functions. So we know that having too much insulin is inflammatory. But insulin is actually really important for activation of the cells of the adaptive immune system and further activity.

So we need insulin for example for cytotoxic T-cells to be activated. They actually have more cytotoxic activity when there is a little bit of insulin around and those are the cells whose job is to patrol the body for cancer cells and kill them before they turn into tumors and those are the cells whose job is to patrol the body for infected cells.

So a cell that is infected by a virus or bacteria and kill those cells. So they are really important cell type whose activity is supported by insulin being in that happy medium range. So you have some insulin but you are not insulin resistant.

And then insulin is really important for sex hormone regulation. So especially testosterone but also estrogen, insulin stimulates testosterone formation and inhibits a sex hormone binding globulin which is a molecule that circulates through our blood. And binds with testosterone and estrogen and other androgens and renders them inactive.

So this is why we see decrease in testosterone and estrogen in insulin resistance but this is also why insulin resistance increases risk of PCOS. And this is also why there's a link between insulin and cortisol. We really interestingly see that when insulin goes up, cortisol goes down.

When cortisol goes up, insulin goes down. So this is a really interesting cross talk between insulin and cortisol.

So we've got all of these functions in the body that are not related to just get insulin so that your blood sugar can go into your cells, it's separate signaling, some of it is competitive signaling with insulin like growth factor. Some of it is independent of that. It's a separate insulin receptor for example in inflammatory cells and it really emphasizes the importance of, we need to be producing some insulin. We want to be maintaining insulin sensitivity so we are not producing too much insulin.

So we have this need for being in that happy medium range and the way we get into that happy medium range is by eating whole foods sources of carbohydrates. So high fiber carbohydrate sources. So they are slow burning, eating them as part of a meal. So eating them with protein and fat can help regulate how those carbohydrates impact our blood sugar. And by not fearing them but not going crazy.

So it ends up right back where we started and right what we see in hunter gatherer populations what allows us to get sufficient nutrients of balanced macronutrients.

[0:41:57.5] AVH: It seems like with insulin as with everything else, it's about balance versus all or nothing which again, we as humans like to do that black or white all or nothing thing which is why the keto diet is so hot right now because really, a lot of times it's easier to be all or nothing than it is to find that balance that works. That's a little bit harder to find for a lot of people because people who like to follow rules and if this rule just don't ever eat carbs, I mean that might be tough.

And it might be unpleasant but it's an easy thing to get your head around versus find this perfect balance. And I think you talk about in the book, if not talking about people who are dealing with diabetes or cancer or anything like that but people who want to maybe lose a little bit of body fat, maybe want to feel a little bit better and they are trying to hone in their diet and they are thinking, "All right keto sounds like it will work, no carbs that's great."

But would you say that maybe that's working for people, because it is working for some people, maybe because it is simply switching from a standard diet that is full of processed foods, maybe too much carbs, maybe some foods that are not helping them with their health and they are moving to something that's at least temporarily is better? Or is this something that it's still so new that we are not really seeing what the long term effects of this super low carb thing is?

And I guess part of that too is you talk about if people are trying to lose fat, ultimately again it goes back to – it's portion control and it's that mild calorie restriction versus cutting out any macro nutrient and then a lot of these people who are doing keto, they are losing weight not because they are not eating carbs but because they are generally overall eating less food because they are eating this high fat satisfying meals.

Yeah, I guess maybe let's talk a little bit. I got a lot of questions there.

[0:43:45.0] SB: Yeah and I think you half answered the question for me so thank you for that. The answer of why it works, we've actually got some really rigorous studies now showing that ketogenic diets, very low carbohydrate diets do not provide a metabolic advantage.

So you will see this in a lot of pseudo-science, pro-keto articles on the internet that turns you into a fat burning machine and that is not actually backed out by scientific evidence.

Scientific evidence really puts the nail in the coffin in the insulin hypothesis and shows that the reason why very low carb ketogenic diets work is because it provides a structure that results in caloric deficit. And all of the weight loss can be attributed to that caloric deficit and in fact, ketogenic diets because they are low protein, compared to sort of an Atkins style low carb diet can result in more lean muscle mass loss than sort of Atkins style which also causes a caloric deficit.

But this is why so many people find natural weight loss with paleo because studies also show that an out of the box standard paleo diet, eating fruit and vegetables including starchy vegetables and usually the studies have lean meats but they are not super low fat, on average will result in a 400 calorie a day deficit and that permits weight loss, if you weren't so overeating before that 400 calories isn't enough to achieve an energy deficit.

So we have these studies that really conclusively show that calories matter. It's not everything because there is a lot of other metabolic controls going on here. Having too large of a caloric deficit tanks your metabolism and can actually permanently tank your metabolism.

It will be really hard to raise your base metabolic rate after following a severely calorically restricted diet for a very long period of time. And we are starting to get some evidence that low carb diets can do the same thing because of the effect on thyroid hormones.

So they tank your thyroid hormones that reduces your base of metabolic rate. It's why it makes it harder and harder to maintain that weight loss. There's some evidence of maladaptation in terms of insulin and lectin sensitivity to very low carbohydrate diets and there's still a lot of information that some things that we have really good data in animal studies but we don't have the confirmation in human studies. We still need more information on this. But we can pretty conclusively say calories matter.

And if we are looking to lose weight, nutrient sufficiency is super important. There is a huge host of nutrients that are required for fat metabolism. So nutrient sufficiency is really important. We know that eating more protein helps maintain lean body mass during weight loss.

When you lose weight, you'll always breakdown a little bit of muscle that's just how the body uses stored energy and it uses all different kind of stored energy.

It uses stored glycogen and stored fat and a little bit of protein to be able to make up the difference. But if you are consuming a higher protein diet that will help protect muscle during weight loss which helps protect based on metabolic rate. So that becomes super important. So I lost a 100 pounds with a low carbohydrate diet and I can tell you the reason why it worked is because it dropped my caloric intake and all of these dietary approaches exclude hyper palatable foods that override our satiety signals.

So they tend to focus on the more filling foods as you said and they tend to avoid these addictive foods that tend to encourage us to overeat just because we can't – our body is just confused about whether or not it is full because holy smokes that cake is so tasty.

You know I think one of the things that we're starting to see with, sort of anecdotally with the rise in popularity with ketogenic diets, is a growing number of people who have these really broken metabolisms because they do cause – so long term ketogenic diet does cause insulin resistance.

And you'll have somebody from that community will say, "Well it won't matter because you're not consuming carbohydrates." Except that it doesn't give you any flexibility to stray, to go on a holiday and eat some fruit. It doesn't give you that flexibility and one of the things is in terms of long term, we don't really have – you know if we eat too much sugar we cause this broken metabolism that we call diabetes.

We don't really have data yet for if we only eat fat, what happens. Except that there is some at least animal studies to show, yeah it breaks your metabolism and we don't understand what all the implications are but if it is messing with your adrenal axis, your thyroid, your sex hormones, your bone metabolism and your muscle metabolism, your muscle building, I mean the chances of that having long term effects that you are going to have to recover from is really, really high.

Whereas a more nutrient sufficient balanced macro nutrient approach with a moderate caloric deficit, this is what standard, out of the box, paleo does and it also supports weight loss and weight loss that doesn't have these potential effects to other biological systems.

You know I was morbidly obese. I was borderline type two diabetic. This is a part of my own health history. I really understand and relate to the desire for just something that works that's not hard.

This is terrible, I used to wish that if I only could get some kind of disease that forced me to eat healthy and made it easy for me to lose weight.

[0:49:36.0] AVH: I have said the same thing. I feel like a jerk when I say it but I tell people all the time and I work for Paleo Magazine, I'm like, "I'm not celiac, I could consume dairy, I can pretty much eat anything. I have the stomach of a steel trap." And sometimes I regret it because

I have no hard line. I can eat that cake if I want to, I shouldn't but I can and that makes it difficult right? It's hard to say no.

[0:49:57.8] SB: It does so you know, I really understand the desire for a quick fix but I try to emphasize to people is, every diet helps you lose weight. There's a hundred different things that will help you lose weight. Keto will help you lose weight, low carb, Atkins, WeightWatchers, you can lose weight on weight watchers. You just count your calories, you can lose weight on cabbage soup diet, remember that one? There's tons of different ways to lose weight.

Maintaining is what is hard. Maintaining that weight loss and maintaining a healthy weight afterwards and so if you take a dietary approach that increases insulin or lectin resistance that tanks your metabolism that weight loss maintenance is going to be extremely challenging on the other end. So slow and steady wins the race here and nutrient sufficiency becomes super important. Anti-inflammatory diets like a lot of phytochemicals that is the other thing.

It's as we're burning our storage fat energy, we produce a lot of oxidants and so having a lot of antioxidant phytochemicals from vegetables in our diet becomes a really important way to protect our bodies during weight loss. Eating a lot of fiber can also protect as we are burning through that fat. We will often liberate a lot of toxins and excess hormones. So having a lot of fiber in our diet can help us eliminate excess hormones and stop them from being reabsorbed and back into our circulation during weight loss.

Eating a nutrient dense diet so the liver has everything it needs to detoxify can be really, really helpful during weight loss. And all of a sudden we're talking about eating. A lot more plants and staying hydrated and we have this whole separate collection of research that shows that vegetable consumption is the number one predictor of weight loss success and weight loss maintenance success. And so somebody who eats a lot of vegetables, they have an easier time losing weight because vegetables are not as calorically dense.

So it tends to lower total calorie intake just because you fill up on vegetables that don't have a ton of calories. And it's the number one predictor of being able to maintain that weight loss because of again, when you are just eating a lot of vegetables it stops being a diet that you go on and then you go off and it starts being the way that you eat and so once you have something

that's maintainable that you can actually do healthily that promotes your health for the rest of your life, that's where weight loss maintenance comes from.

And I really feel like this desire for a quick fix, there's so many things that were like the low hanging fruit, that are so much more obvious barriers to weight loss success. So when people adopt a paleo diet and then they go, "Oh I lost weight at first. I don't know why I am not losing weight now. I am going to reduce my carbs and I am going to go keto," right? This sort of like, "I am going to more and more extreme and more and more restrictive version of my diet to get the results I want."

There's all of these other places where we can be troubleshooting so not getting enough sleep tanks your metabolism, increases your hunger and it also increases your dopamine response to food. So it is actually permissive for food addiction. So just not getting enough sleep can be stalling weight loss. Stress can be stalling weight loss, you can boost weight loss by increasing muscle building levels of activity. And not through just burning calories but just through its increase in basal of metabolic rate.

Sort of sub clinical, hyperthyroidism is really common and that can be stalling weight loss. So having a function medicine specialist do a thorough evaluation of thyroid function can be really helpful. Having them evaluate adrenal function can be super helpful. Looking at nutrient deficiencies, vitamin D deficiency makes it really hard to lose weight and approximately 75% of westerners are vitamin D deficient. Having hormone imbalances can make it really hard to lose weight.

So there's all these other places to dig and unfortunately, those are all things that you can't fix by manipulating macro nutrients. Some of those things you can fix with adjustments to lifestyle, stress management techniques, more sleep. Some of them you can address with nutrient sufficiency, maybe supplementing for severe deficiency.

But those are all the things that are much more likely problems - the problem is not probably not fat deficiency for people going from paleo to keto. That was probably not that was holding you back and one –

[0:54:07.6] AVH: But all those lifestyle factors are hard work, that's a lot of hard work. That is easier than just cutting out your oatmeal and French fries and stuff. That's the thing.

[0:54:17.7] SB: It's also something that is a habit that's worth working on because once those healthy habits can be sustained, it supports lifelong health and I think for most people when you take a step back, I mean right now it might seem like the biggest problem is losing those last 30 pounds but when you take a step back why do you want to lose that last 30 pounds? You have an idea that your life is going to be magic, unicorns and rainbows and then you are going to live forever when you lose that 30 pounds.

What that really implies is that health is actually and lifelong health is the number one goal. And you know yes, it's wonderful to feel confident in a bikini but is it worth being sick or is it worth taking years off your life and most people would say, "Well no. I would far rather be healthy than thin if I had to pick one or the other." But the great news is typically you don't but we want to get healthy to get thin not get thin to get healthy.

[0:55:15.5] AVH: Yes, okay one last question that I want to touch on because I don't want to keep you here forever but it is something that you talked about a little bit and I'd like you to get into a little bit more is the concept of inflammation and how that relates to health, autoimmune disease. But generally just health in general because I think one of the things that again, this is about balance but I always found this one particularly overwhelming for me as somebody who has an athletic background. And likes to work out a lot and the more I read it seems like almost everything can cause inflammation.

Like too much exercise, not enough exercise, poor food, too low calories, too high calories, there's not enough sleep or maybe even sleeping too much. I mean it seems like everything causes inflammation so I'd love to and I guess one of the answers is eat more vegetables but what are some ways to address minimizing inflammation in your life but not obsessing over it too much because I am worried like,

"Am I working out too much now? Should I stop working out? But then I'm stressed out because I am not working out enough and am I eating enough?" You know? What are some ways to really address this and recognize maybe the symptoms of if you are having too much

inflammatory stuff in your life, versus how you can tell that you are sorting that out? If you can talk to us a bit about that.

[0:56:32.8] SB: All right, so we'll be here for the next three hours.

Actually, let's start with the last part of that question which is how do you know if you're inflamed. So inflammation or this dysfunctional immune activity is at the heart of every chronic illness. It is potentially a cause for obesity, a cause for diabetes, it's the cause of cancer, it's the cause of autoimmune disease, it's the cause of asthma and allergies. It increases the risk of cardiovascular disease. Of chronic kidney disease, of dementia, of mental health problems.

So inflammation, especially the chronic systemic wide inflammation is bad. It causes a ton of problems. With that being said, inflammation is also a key part of how our body protects us against viruses and bacteria. It's a key part of healing so if you cut yourself, you want inflammatory processes to help repair that tissue.

So what we're looking for when it comes to a healthy immune system, is we want an immune system that can turn itself on really easily when it detects a threat. We want the threat that it detects to be a real legitimate threat and not like my thyroid gland. Because my immune system thinks my thyroid gland is as bad a parasite.

We want that immune system to be able to turn itself off really well when the job is done and we want to avoid systemic diffuse inflammation so that type of inflammation that is body wide that doesn't have a target. Because it's that type of inflammation that is damages tissue at this very low level all the time. And it is so incredibly linked to chronic health problems like cardiovascular disease, diabetes, cancer, autoimmune disease.

So the immune system is very, very sensitive to our diet and lifestyle choices. There are some genetic things that influence immune function and that's why certain people have an increased risk of autoimmune disease or have an increased risk of cardiovascular disease. A lot of that boils down to basically having an immune system that's got an itchy trigger finger.

But in the end, at least the majority two thirds to three quarters of how our immune system functions is directly related to our diet and lifestyle choices. And there's this other bit that's exposure, toxins, genetics that we can't really change but given how much we can change just about everybody can have a normal functioning immune system with better choices.

So things that are inflammatory, nutrient deficiencies. Pretty much the immune system is a huge nutrient hog. It really goes through the nutrient resources in order to do its job and the regulatory aspects of the immune system or the parts of the immune system that controls systemic inflammation that turn off the immune system when they job is done, those are the aspects that actually use the nutrients that we're most likely to be deficient in. Like vitamin A, vitamin D, zinc. So nutrient sufficiency from the diet becomes super important.

We know that having a healthy, diverse gut micro biome is essential for normal immune functions. So eating a lot of fiber from vegetables. The fiber from grains doesn't actually support the right type of bacteria growing in our guts but the fiber from vegetables is a different type of fiber, it has more diversity of fiber types and it is fiber that is wrapped up with antioxidants so that promotes a healthy, diverse gut micro biome and that regulates immune function.

So eating a lot of vegetables, as you said. Overall avoiding insulin resistance, avoiding refined carbohydrates, keeping fat intake moderate is actually really important for gut micro biome health and for immune health. So we know that too much saturated fat can be inflammatory.

We know that high Omega 6 intake can be inflammatory. So keeping fat intake in that 20 to 50% range. Total saturated fat in that 10 to 15% range of total calories and balancing Omega 3s to Omega 6s is really important for a normal functioning immune system.

Protein sufficiency is really important for normal functioning immune system as well like micronutrients, vitamins and minerals, phytochemicals, fiber, protein and healthy fats all super important for immune function.

And then the immune system is very sensitive to our lifestyle as well. There are certain regulatory aspects of the immune system that only function well when we're asleep. Sleeping helps turn off the immune system, helps it regulate itself.

It helps reduce systemic inflammation and being sleep deprived by itself is inflammatory. Stress also has a really strong stimulus to the immune system. So chronic stress is basically an inflammatory and stops the immune system from being able to regulate itself and turn itself off and then being sedentary is by itself inflammatory.

If you sit at a desk job for eight hours and then you go straight to your CrossFit class, it doesn't actually balance out the sitting for eight hours.

So this is why we've embraced things like treadmill desk or desk cycles or movement breaks throughout the day. Moving for two minutes out of every 20 during the day will completely negate the health detriments of being sedentary. But then also some sort of muscle building activity becomes really important. So not saying that if you work at a treadmill desk you can skip CrossFit class but that both are really important to incorporate into our lives.

And we know that over training is inflammatory and it inhibits immune function. It stops the immune system from being able to regulate itself. It increases risk of immune and autoimmune diseases and so avoiding that overtraining, which if you have a lot of muscle pain and you go and you warm up for your next workout and that muscle pain doesn't immediately dissipate as soon as your muscles warm up that's a really good sign that that's overtraining.

If you are not sleeping well that's a really good sign that you are overtraining. Signs of inflammation in the body that's not well regulated as any chronic illness. Any kind of joint or muscle pain. Mood issues, so just feeling grumpy, headaches, not sleeping well, any kind of skin issues, any kind of jaw issues. So pretty much if you are not feeling awesome you probably have some inflammation.

Usually within our community it's not diet necessarily that needs to be dialed in. Although I know a lot of us can benefit from increasing vegetable consumption but it is usually something like sleep. Sleep is at the bottom of our to-do lists. It's the thing that we do in the remaining hours in our day and we really need to be prioritizing eight hours of sleep every single night.

I think grownups need bedtime just like kids do. So it's sleep or it's stress and they often go together. If you're not getting enough sleep you're less resilient to stress. You are going to get more stressed out over something and then if you are stressed that's going to erode your sleep quality so they usually go hand in hand and most people really have to work on both improving sleep and managing stress at the same time in order for things to fall into place.

Yes, pretty much bad diet and lifestyle choice causes inflammation and increases the risk of chronic illness and that is one of the reasons why regulating the immune system or reducing inflammation becomes such a key rationale for informing better diet and lifestyle choices.

You can get into testing, you can measure seri active protein very easily. Some functional medicine specialist can do a cytokine panel and look at things like interleukin 6 or interleukin one beta and get even more detailed in terms of what subsets of inflammatory cells are active. But really when we take a step back and look at nutrient density, gut micro biome health and sleep, stress and activity, it becomes a much simpler equation in terms of regulating our immune system and reducing inflammation.

It's often one missing piece for people or maybe there's this downstream effect right? You are not working on sleep and that's making you feel less motivated to work out and mix your stress when you're stuck in traffic go higher. But there's often like, "Okay I can trace this back to here's this one thing that I can work on," and then when that's not enough of course functional medicine is awesome to be able to dig deeper and look for persistent infections.

HPA axis dysfunction from chronic stress, there's lots of other places to dig. But the basics are basic, right?

[1:05:00.4] AVH: Okay that's a great place to end off. I have so many more questions to ask you but I want to be respectful of you time. But I think that this book is such an incredible resource and there's so much information but it's accessible.

You don't have to be a doctor to read it. Anybody can read it. But it is funny that the amount of information is vast but so much of it just keeps going back to the basics. As you said, the basics and moderation and balance and understanding yourself.

And empowering yourself and I think it is funny too that this book is again this huge resource that I think is going to be valuable for a lot of people but ultimately you can almost boil down a lot of it to what your mom would tell you to do which is to go play outside, eat your vegetables and then go to bed. I mean who better than paleo mom to tell you that? I think it's perfect.

Anyway, I think that's a great place to end off and thank you so much for taking the time. And if people want to get the book as they should and also follow what you are up to and follow you online, where should they go to do that?

[1:06:02.9] SB: So *Paleo Principles* and my other three books are sold everywhere books are sold, Amazon, Barnes & Nobles, bookstores all over the place, online bookstores. CostCo usually has one of my books, the books are easy to find but of course you can find out more about me, the link to my social media sites or about my new projects, learn about my courses at thepaleomom.com and that's home central. So if you are having trouble finding my books you can find links to purchase them there.

To find out more about the autoimmune protocol lecture series because the next session is going to be starting soon and it's a really tremendous resource for people with autoimmune disease, because it is a deep dive into the science behind the autoimmune protocol but for the autoimmune sufferer.

It is for general audience which is kinda my jam. I like explaining science to people who didn't know that they were interested in it.

[1:06:57.7] AVH: Right, yeah we'll have to get you on again and maybe we'll talk about that specifically. We could do a whole other podcast with that one I think.

[1:07:04.0] SB: Or two or three, yeah.

[1:07:04.9] AVH: Or two or three, yeah.

All right Dr. Ballantyne thank you so much for your time and we'll do it again soon.

[1:07:10.1] **SB:** Thank you again for having me.

[END OF INTERVIEW]

[1:07:15.9] **AVH:** All right everybody, thanks for listening. Don't forget to follow Dr. Ballantyne on social media @thepaleomom. Don't forget to follow us on social media @paleomagazine and if you want to have a chat with me about the podcast like if you have any suggestions for guest or topics or you just want to talk about something you learned, I'm always happy to listen and chat with you. So hit me up on Instagram @themusclehaven.

So that's it for me, I hope you enjoyed the podcast. As always, make sure you're subscribed to Paleo Magazine Radio on iTunes or wherever you listen to your podcast. You can come and hangout with me every week and that's it. I'll see you next week.

[OUTRO]

[1:07:52.8] **AV:** Paleo Magazine Radio is brought to you by the Paleo Media Group and is produced by We Edit Podcasts. Our show music features the song *Light It Up*, by Morgan Heritage and Jo Mersa Marley, and on behalf of everyone at Paleo Magazine, thank you for listening.

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