

## Paleo Solution – Episode 136

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Robb Wolf: Hey folks Robb Wolf here. Episode 136 of the Paleo Solutions pod cast. We have a whole gaggle of folks. As usual Greg Everett, we've got one of my internet stalkers Chris Espinosa who's been tracking me down for years, and then we have strength and conditioning and hormonal modulation guru expert extraordinaire Brad Davidson on today too.

Greg Everett: You have a hell of a title right there.

Robb Wolf: High standards.

Brad Davidson: Thank you. Totally excited guys. This would be fun.

Robb Wolf: Stoked and as we were trying to get our internet connections all figured out here Brad just quipped that out of everything under the sun that we could usually tackle that would be both fun and relatively easy to discuss we're talking some estrogen today and Brad a friend of mine who's a doc for the Navy and he's a hormonal mod like sleep expert.

He's of the opinion that you could do a pretty solid high level lecture on male endocrinology related to testosterone estrogen conversion, growth hormone etcetera and it'll take you about 45 minutes but a good treatment of female endocrinology is about 200 hours.

Would you agree with that?

Brad Davidson: 150%

Robb Wolf: Nice.

Greg Everett: So 300 hours.

[Laughter]

Brad Davidson: Yeah I was telling my staff where I'm like I'm gonna be with Robb Wolf and the discussion has to be estrogen - the most confusing thing on the face of this Earth especially with women.

[Laughter]

Very interesting.

Robb Wolf: We try to have some fun on the podcast but also a lot of the focus is trying to help people and everything. I'd largely very superficially talk about estrogen, progesterone, what happens during a normal cycle, maybe some things that go wrong with PCOS or insulin resistance like some decreased sex hormone binding protein and some increases in estrogen and maybe that antagonizing progesterone and stuff like that.

That's about the level that I go into and a number of women have gotten pissed at either what is this some sort of sexist website and I was like no. I just don't want to be an asshole and talk about things that I don't really understand and give bad advice. So I'm so glad Brad's here. If you flood it then we'll just delete the whole thing and act as if it never happened.

Chris Espinosa: Yeah erase it from memory.

Robb Wolf: We've got to bring Chris in on this cuz - Dude tell folks a little bit about who you are and your incessant stalking of me and all the rest of that stuff.

Chris Espinosa: Yeah I guess would be that. You have my level 1 like 5 years ago and I had like some of the top top people there of the CrossFit world that are still extremely humble and very nice so Kelly Suaret I think was there, Nichole was there. Just like a good group of people and I just got hooked by your personality and just fell in love with you at first sight.

Robb Wolf: I'm married but you know what I could be curious.

Greg Everett: I feel like someone's office is getting ransacked right now.

Chris Espinosa: That would be mine.

Robb Wolf: Yeah it sounded like a CIA break in or something.

Chris Espinosa: Yeah it's probably Squatchy. How do you think I'm setting this up?

Robb Wolf: I'm telling you man. That is totally some sort of covert op. I should have seen behind the beard. So Chris which location was that level 1?

Chris Espinosa: That was up in one of the Santa Cruz locations not the main one but I can't even remember honestly.

Greg Everett: Is it the giant one?

Robb Wolf: The big fitness palooza that had 150 people at it?

Chris Espinosa: Yes. Yeah Rob Miller was there.

Greg Everett: 55% vomit rate.

Chris Espinosa: Yeah I definitely went through trauma after that cert. I sold everything to get there. I slept in my car. I did everything bare minimum to get to that cert.

[Laughter]

Robb Wolf: Interesting back story on that there's still a video I think going around any are you okay which was the work out for that day so there had been a lot of scuttle but on the back side of the HQ staff of which I actually was a member of at that point, just talking about the need for better quality of movement and everything.

So we put people through this massive workout. It's like a 20 minute rotating station chipper kind of gig and here's how form faults were dealt with. You were supposed to count for the person 18, 19, 20 rotate.

So when the person got the movement wrong then you gave them a no rep. So people were failing and then we start no repping them which gives them even more volume and I was arguing against this and I'm like this doesn't make any sense. We should just stop them and they're like ah. It's bullshit.

So yeah that's funny. You were at one of the classic events dude. There was a whole lot of interesting back story going on on that.

[0:05:17]

Chris Espinosa: Yeah. I also ended up spending after the entire seminar 45 minutes with Rob Miller learning the Push cert and I was so mentally crushed and he had me holding the bar the entire time and at what point he had me set it down because I was just wasn't doing anything cohesive anymore or coherent.

But even the night before on the first day I became friends with Eric Reclaire and a few other people and we went out that night and I was just talking thrash so in the morning they all surrounded during the lunch break work out and just handed it to me.

[Laughter]

I will never forget that.

Robb Wolf: Well I know this guy in Palo Alto that's pretty good at the Olympic lifts so if you ever roll around there I can give you a reference.

Chris Espinosa: Yeah if you've got a name for me that would be awesome.

Robb Wolf: I'll do it. So we wanted to mention Chris because Chris put this thing together and he's been lurking in the background on a lot of stuff continual commenter on the blog and everything but I really want to talk to Brad Davidson.

Brad I am so stoked that we got to meet. I followed your stuff at various points. We have interesting parallel backgrounds. Can you give folks just a little bit of a background how you're coming in to all this strength and condition stuff. You were on the bobsled team. You've got a hell of a pedigree so tell folks about your self.

Brad Davidson: Yes so it's been about 12 years ago now. I broke out of the traditional gym setting and I originally followed Paul Check and became a spinal rehab expert kind of guy and I started my company out of my car and just driving in people's homes, I'd set up a training room in a garage and trained them.

Nine years ago I opened up my first little gym and all set and I started having these athletes, these people maybe can handle a spinal rehab was too easy so have to roll in the next round which was strength and conditioning. A lot of my athletes were sport. So I did that for a while, got great results but then found they were very limited.

So I started referring out to nutritionists, and boy I did not like the results coming back from the average registered dietician with nutrition, and nutritionists in general. So I thought you know what I've got to do something about this. So my next journey was in nutrition supplementation and that's when I met Charles Poliquin.

I studied him for years. I remember back in high school when I wrote articles in muscle media, signed up for his bio sig thing 8 years ago and was just fascinated with it, blown out a lot by it, for 6 months coming out of it I didn't even touch it. I was so afraid of it.

Just over the years learned it. Now probably about 6 years my focused has been learning from good nutritionist, medical doctors. I spent a lot of time with the medicals staff I met at Gym X, a lot of functional medicine gurus and just created my own composition for body composition mass and athletes performance bases standpoint.

I had a little run with the bobsled. I was the scrub. I was good enough to be there but there's no way I'm ever gonna be in an Olympic team. I was the pilot pusher so the new guys would want to learn how to race bobsleds. That's what my job would have been.

[Laughter]

Robb Wolf: Nice.

Brad Davidson: It was a fun experience. I've been trying a bunch of throwbacks and thought boy I can really hang with these people. I'm gonna try to do something crazy and I contacted a bobsled coach, told him who I was, they gave me an option. Yeah I'll let you come out and try out, you show up and you suck.

I'm sending you home and you're gonna pay for the whole week, if you can finish in the top 20 I'll give you a spot and pay for your week, and you'd be good to go. So that was that.

Robb Wolf: Nice. Go ahead.

Brad Davidson: I was gonna say in regards to the whole estrogen world a lot of my clients are bringing their wives and would always insist in same things. Fat in her legs - I can't get it off. Charles is really big on the

estrogen thing so I really had to dive deep and try to figure out why in the world this didn't work and how to get it off.

Robb Wolf:

Addressing a little bit the bio signature thing I went through that too. I haven't used it clinically a ton just because we ended up phasing out of the gym and moved and so I haven't had a lot of bodies to tinker with but the work that I did do it seemed like certain sights I felt like were really quite representative of what we're going on like the insulin issues whether it was from dietary or kind of a metabolic genetic insulin resistance verily solid, testosterone seemed solid, estrogen seemed solid.

But some of the cortisol stuff seemed a little iffy. If you were to rank out the way that the bio signatures sites give you information do you feel some of them are very very solid and you can just really hang your hat on them or are there some others that you're like ah, there's a lot more variability to it or do you feel like it's pretty solid across the board?

**[0:10:13]**

Brad Davidson:

I would agree with you. I've sent people in for 16 hour cortisol panels and it comes back totally great but on the Biosig it shows that it's the number one top priority. So the testosterone sites are great. The actual science is great. I agree with all those review.

The only problem that I have with a bio sig and Charles even talked about this. It doesn't bring out the foundational principles. So in our system here now we dissect and we go real deep. It's actually up to the third tier that we really start addressing the bio sig results.

I spent a lot of time with Rob Rakowski. I like his style and he's real big on foundational principles. They've got to have high nutrient. They've got to have high oxygen and have to be low acidic in the blood. If that is not the case you have to start there.

So we dissect that and then we move into digestion, just real simple things - elimination. If someone's not going to the bathroom when they're struggling with digestion the last thing you want to do is to start detox, find estrogen, for detox find them in general.

So we'll basically work on those things first, get a real solid diet down and then we'll start really addressing the actual hormonal structure of the human body.

Robb Wolf: Gotcha. This is probably completely diversionary but I've been back and forth on the acid base balance, like I've hung my hat a little bit more on the deal of metabolic acidosis being most - the big issue being if somebody is metabolically broken they're going into glycolysis consistently - I felt like that's the bigger issue versus trying to have a consistent net alkalinising diet.

But would you disagree with that? Do you think that gunning for that net alkalinising diet and then restoring gut health and everything - is that more the track that you're taking with this whole thing?

Brad Davidson: No. I agree with you. It's more or less looking at how well they can buffer acid. I don't believe that you could really push blood Ph too much by what you're eating so I'm just trying to set them up where they can have a better buffer response with regards to how fast they can buffer acid if that makes sense.

Robb Wolf: Yeah totally.

Brad Davidson: Ph challenge will make them acidic and we'll see how long it takes to become alkaline again and Rekalsi has given us a nice graph to show where that lies.

Robb Wolf: And then based off that you'll do some tinkering with supplementation.

[Cross-talk]

Brad Davidson: We'll mostly use lots of vegetable loading, lots of powdered greens, powdered fruits and things like that. I was reviewing some of his stuff and he talks about how if the body is not alkaline enough and doesn't buffer acid well enough it will affect how well hormones and enzymes work.

So that can be a very small underlying cause as to why estrogen dominance is kicking in or enzymes that are breaking down estrogen are not functioning very well. It's a powerful thing. It's a really simple thing to correct you can deal with right out of the gate.

Robb Wolf: Gotcha. So probably correct me if I'm wrong but I'm guessing that you're probably not getting a ton of super overweight metabolically deranged women that insulin issues are kind of a big deal. It sounds like you're kind of augured down into this scene where the gals by most standards are real lean, real fit.

Typically everything above the waist line is super lean, super jacked and then they're dealing with that super just resistant to any degree of any calorie restriction, cardio high intensity interval training, fat around the legs. Is that the bread and butter that you're dealing with at this point?

Brad Davidson: Yeah those are the most difficult ones. Yeah we do see a lot of the overweight ones where at that point is all insulin based protocol and they eat so far so fast with that but eventually when it comes to the estrogen dominance, estrogen toxicity it always ends up about that where they're lean from the waist up, holding fat from the waist down, and nothing works. That's when you have to really get tricky and dig deep on the estrogen protocols that you're using.

Robb Wolf: So tell people what an estrogen dominance or estrogen toxicity would look like and we've probably potentially got two different sides about where you might have gals who have really thick receptor site density in the tissue and so the blood work shows some decent estrogen levels, nothing few concerning but they just seem to have some really responsive receptor sites.

**[0:15:08]**

And then the other side of this is that legitimately we've got too much estrogen. Either they're producing too much not clearing it from the system. Could you walk people through some of that and even how the body will remove estrogen under normal circumstances then maybe how that goes side ways?

Brad Davidson: So estrogen is a toxin in the body. The body's always trying to detoxify and then metabolize so you're rid of it. So the body will make up estrogen and then it'll detoxify it into either 2-hydroxylase, 4-hydroxylase or 16-hydroxylase and those are then metabolize so now the body can actually take through the process and detoxify.



The problem with this is that 2-hydroxylase is really good for us. That's actually the good metabolized estrogen. It doesn't do too much damage to the body. It's pretty easy to get rid off. The 16 is the really dangerous one. That's the one that is linked to all the breast cancer and prostate cancer, things like that.

So a lot of then you want to do is you always want to make sure you're balancing out 2 to 16. There's also 4. Four is bad but it doesn't tend to run that pathway as much as the 16. For instance if there's a high level of 16 versus a lower level of 2 there's a greater risk of breast cancer and if there's a high level 2 low level of 16 there's a much less risk of breast cancer.

So the body basically breaks it down to these and then deliver uses phase 1 and phase 2 conjugates detoxify it. The other problem that we see - there's two other things methylation can be disruptive - it's where the process basically allow the estrogen oxidize to a quinone. I guess you say that word.

That can do damage to the body or it'll get into the digestive track and then basically if you have too much bad gut flora b-glucuronidase will help break up the estrogen that's leaving the body back into the blood stream. That's a really common scenario that we see is bad digestion.

So we'll always attack improving digestion first. You want lots of high fiber and lots of good gut bacteria to prevent that part from happening because that is just a destructive pattern. It's really hard. It's really hard to figure out. It will drive women crazy. So they'll take all the estrogen products they've heard about will fall with proper diets and they'll still get worse and worse because they have so much of b-glucuronidase in their gut. It's an acid little enzyme.

Robb Wolf:

How do you deal with that? I guess if you were talking about gals that are already pretty lean and were just talking the estrogen side of this and you're not really too worried about any type of an insulin protocol. We're kind of assuming that they're insulin sensitivity is pretty good so we're not necessarily running these gals on a low carb diet then.

They're probably moderate carb or at least taking advantage of post workout carbs and stuff like that. So you're able to maintain gut bacteria in that way because normally I think I'm typically

working on the other end of the spectrum - the folks that are coming in and they're like almost dead and they're insulin is like the big issue.

So what type of diet are these gals eating? Is it Paleo? Are you worried about grains at all? How are you tackling that stuff?

Brad Davidson:

I don't like grains. I really like the Paleo diet but when they're really lean and you go too long without any type of carb intake I find metabolism tends to crash.

So there are two basic types of estrogen receptor in the body - alpha estrogen receptors and beta estrogen receptors. Alpha estrogen receptors store fat and if promoted by estrogen or high insulin loads will actually promote alpha estrogen receptors. They'll just continue to store fat.

Now women have a lot more alpha estrogen receptors in the waist down than men do. That's where women carry fat in their legs. So elevated estrogen levels blocks that, insulin blocks that and if you're in a low carb diet and in trying so I'd like to go strict Paleo up to the work out.

I've even incorporated some of the intermittent fasting for extreme cases. I believe it's Ori, the estrogen diet or whatever he calls it. He does a lot of that. I found that's worked real well because you'll promote a little more the beta estrogen receptors which actually block fat storage and you'll impede the alpha receptor from causing a problem most of the time.

Let's say majority of the time. Sometimes it's not that easy. No carbs before work out we carb load them after their work outs.

Robb Wolf:

Gotcha okay. Which is generally the way we roll them with this stuff. So even folks that are insulin resistant we'll do a little tinkering with that and then if they're insulin sensitive then definitely roll them down that path.

**[0:20:05]**

Where do you go once you established some Ph balance, we get the gut health re established and part of the re establishing the gut health are you doing any diagnostic work, look at some small intestinal bacterial over growth, are you looking at any type of

potential restraints that they might have one versus another or you just kind of supplementing with some beneficial flora and trying to displace the bad stuff. What's your methodology with that?

Brad Davidson: From what I've seen I know that the lactobacillus acidophilus is the best good bacteria you can put in the gut to off set the b-glucuronidase. So I always use that. If you think there's candida it's always cheaper to heal the candida than test the candida.

So if you think it's there you might as well just run a candida elimination diet and get rid. Extreme cases I will keep on elimination diets that gets rid of all the possible scenarios that are creating any type of allergic reaction or anything like that. So I will do that at times.

In regards to that it's pretty basic. I just pump them full of fiber, I make sure they're going to the bathroom really well, I make sure their intake of vegetables and fruits are really high and then just make sure that I replaced good gut bacteria and that usually works right there.

Extreme cases I will refer out to a functional medicine doctor for a full stool analysis all that but that's very rare.

Robb Wolf: Do you have a preferred probiotic that you use?

Brad Davidson: Oh I mix around a bunch. I'm a big fan of the Metagenics Ultra Flora Plus. That one I've been also playing around with one from Xymogen and I just lost the name of it. It comes in a little satchel. It's real easy to use but the Ultra Flora Plus by Metagenics has been pretty staple for me to use for in estrogen dominant world.

Robb Wolf: Cool. Did you do any tinkering I guess it's kind of timing sensitive but getting people doing sauerkraut and all that sort of stuff or do you feel like you need a bigger dose to just get the ship headed in a different direction?

Brad Davidson: I'm pretty aggressive so I always just use really solid nutrients at high levels to try to create a change. I like being aggressive so I tend to give that more. I personally don't eat sauerkraut. My rule is I won't make people do what I don't do.

Robb Wolf: Right. Okay fair enough. What else did I want to pick your brain on with this? So have you messed around with any of the nicotine nic acid receptor site type of stuff or like the nicotine gum with regards to leaning out the legs and some of the antagonism that it has on the estrogen receptor sites?

Brad Davidson: No. I actually haven't heard about that.

Robb Wolf: Oh okay. I want to say a Dan Duchane kind of gig which I've only worked with I don't know maybe 6 or 8 with reasonably high level fitness athletes and nowhere near the detail that you have on this stuff and we've done some tinkering with that and it seemed to have some pretty good effect just like a 2 mg dose 2 or 3 times before noon. So about 6 mg total and definitely seems to help with that lower body fat.

But also what's interesting to me is this protocol of establishing gut health and making sure there's not small intestinal bacterial over growth, making sure there's not candida and nutrient dense deal and intelligently periodised training - we do that for everybody. If you've got an endurance athlete then obviously you tweak things different than an Olympic lifter but we're gonna have Mark Bell on the show here pretty soon who's like a 300 pound power lifter and the dude ended up getting bigger, stronger and leaner eating a Paleo diet and fixing his gut health relative to the standard power lifting shtick of just cram in whatever calories you want down the pie hole and then trying to deal with the after effects of systemic inflammation.

So it's just intriguing to me that across the board if we heal the gut, improve liver function, hormonal signalling is better, inflammation is less you get better immune functions so there's recovery and if there's less inflammation then you have better insulin signalling. So it's interesting that just the consistency it seems like it's across the board the same stuff.

Brad Davidson: It's so powerful. You always have to deal with the foundation first before you ever start getting tricky with your pathways. If you can't get it out in the system there's no reason to try to aid the system in pushing it out.

Robb Wolf: Brad do you have a formularic approach? Let's say specifically with female fitness physique oriented athletes. Do you have some

sort of a stratification of how you break up weights, high intensity cardio, low intensity cardio?

Do you have a little bit of a formula or do you take each person where they are and try to customize?

**[0:25:19]**

Brad Davidson: I take each person where they are and try to customize. I was actually just the other day reading some new ideas by a guy I was just introduced to, Jade Teta is his name, he's a naturopath. He's also a fitness guy and he talks about how in the follicle phase, and the luteal phase of a woman's cycle, you can actually change the way you train them for faster results.

Robb Wolf: Right. Okay.

Brad Davidson: He says in a follicle phase, a woman has really high estrogen levels and is usually when they're miserable coz majority of women tend to be low in progesterone and have really bad PMS symptoms. That's when you know that there's an estrogen toxicity assumed.

But in his scenario, he says that women in that phase tend to burn fat much better than sugar. So he'll actually have them do low, slower, kind of drawn out cardio during that base, he always has them lifting weights coz he says the biggest sin for those women is, which I agree with, trying everything they can to stimulate HGH which going through way as you can to sleep, high protein intake and really bumping up your lactic acid levels, so he has to lift weights and induce slow rub of training.

And then in the luteal phase when progesterone is higher, they burn sugar better. Actually, we have them do their high intensity interval training along with the weight training. I thought that was pretty fascinating idea. I have not applied it yet. The next thing, I will actually start informing with my women and see how it works. This guy has had really good results doing that. It's just a pretty fascinating idea.

Robb Wolf: It really makes sense. If Greg's even still on here, he may have adopt them.

Greg Everett: Of course I am. I'm fascinated.

Robb Wolf: I remember that partner – Was it you or was it Barton who did actually mentioned doing a little bit of tweaking of the loading parameters throughout the – if you can track this cycle to some degree, some intensification blocks throughout the month?

Greg Everett: I have never heard Burgener talk about that but it's very uncommon to manipulate women's birth control to time things better for competition's schedule.

Robb Wolf: Gotcha. Okay. There's been an interesting observation with the CrossFit phenomena and with regards to results that it typically has on women versus men, not across the board coz obviously you've got some dudes like Rich Froning and Khalipa. But they came into the thing already like big, strong jacked, dudes. But I have just noticed that with women, if we just burn them in that lactate pathway consistently and this is probably going back to the growth hormone production, they get fucking burly.

Could you do a little compare and contrast if that's going on metabolically with females relative to do in – I know for myself the less metabolic work I do, the easier it is to put on muscle and be strong. I'm not a Charles Poliquin. I don't cruise around with 20-inch arms and stuff like that, but I'm this really fast twitch. But if I stay out of that metabolic, the glycolytic pathway, almost entirely, I get bigger and stronger. I grow better on ones, twos and threes than I do on fives and eights.

So like the CrossFit thing for me, I will say I get more metabolically fit to some degree. But as far as physique and power and all that, doesn't seem to work that well. But I swear with women it seems to do a completely different thing. What do you think is going on there?

Brad Davidson: This is just my theory. I have not worked a lot of CrossFit high level athletes yet female-wise. My best guess on that is muscle fiber type rounds the same way.

I'm a very fast twitch oriented individual. My vertical jump is 42 inches at my peak, when I was 34. Give me sets of one, two and three, I will grow like a beast. You give me sets of sharp pushing time entertainment, I don't go anywhere. I'll start going smaller.

So I take a girl on intensification based on accumulation basis. I think with women they're so slow twitch-oriented. They're just

pounding on the muscle fiber type they have. They're pricing a lot in growth. I don't really know the beyonds of you. I would be really interested to see how somebody's high level CrossFitters are, the point of drugs, what they're putting in their system that are gonna complete them.

**[0:30:00]**

Brad Davidson:

When I went to the California Regional's for the first time this year, I was blown away. I thought I saw a really good athlete at the Olympic training centers and it was nothing compared to what you see out there competing for these spots for the Olympic Game or for the CrossFit Games. They're a different beast. I've never really seen anything like that. The ability to do 30 power cleans with 225 or women are doing 30 power cleans with 135 lbs. I'm pretty stoked when my high level athletes can do 3 to 4 reps with that.

So I'm in the middle of trying to really learn the system and learn how they're doing it because however they're creating these women, it's just unbelievable how long the work load capacity lasts. So my belief in the system is maybe they're just pounding on the slower twitch fibers and pushing such high work capacity that they're getting more muscular hypertrophy than normal. I don't really know to be honest with you.

With some training, they might put on 6 lbs of lean muscle mass and then no matter how hard you try to put it on, it doesn't really come. When it gets stronger that I didn't know they're strengths levels continue to increase. But there's never a whole lot of muscle mass being. So it's pretty interesting. I'm not sure about it.

Robb Wolf:

A girl in NorCal, Jenny, she chose already pretty lean pretty muscular, mainly an endurance athlete with lift weights and stuff like that but she's really strong and got 6<sup>th</sup> place in the games last year and then she won the NorCal Regionals this year and I think she's put on 15 lbs of muscle. She's just been super dedicated on her nutrition and then her sleep.

Most of her programming is being done by CJ Martin down to Invictus fitness, he's a really really smart dude, one of my favorite pips in this whole scenes. It is interesting. She's just had this complete physique transformation to be able to build the engine to do to capacity and stuff. It's pretty interesting.

Brad Davidson: Anytime you can bump intensity and then push workload capacity. Your body may always take takes grow. So I think the volume means people are being forced of training and they still do that. It's probably the stimuli that's creating that kind of muscular build in a woman. I don't know. It's a phenomenal thing. I've never seen any like it. It was the first time I'd ever been to the Games, really paid attention to it. Once It became a sport, I became really fascinated with it, coz I like building people to go to a sport.

I used to to tell my general... They asked about cross my athletes. I'm like, "CrossFit is CrossFit." You're a professional baseball player, we need to train a baseball player. You're a professional football player, train like a football player.

Now CrossFit has come out, I'm like gosh, I think it's really cool coz it's a sport. I don't go telling people to be a UFC fighter because I think it's safe and the healthiest way to train, If that's what you want to do, do it.

That's how I feel about CrossFit. It is a phenomenal tool and the thing I saw in the Regionals, I noticed, is that you have really lean athletes that are really good and you have fat athletes that are really good. Their nutrition and supplementation for those guys is just like all high level athletes that are very very important.

Robb Wolf: Right. Yeah, the pools have gotten really deep and really mean and very talented in that whole scene. It's pretty interesting. And I agree even though I've had my obvious ends and outs with CrossFit. I'm pretty fascinated by the sportive element of it. I think, Greg and I would both agree that we typically not seen the really broad training input for a 6-week out of season training block, like through an MMA fighter or something. It's pretty good.

But when we start getting in-team season for somebody or like hitting somebody for a fight camp, the demands were so high on that type of training that usual the person is left an actor and not able to do much in the way of their sport-specific stuff. And so it starts getting more into heavyweight lifting, Olympic lifting, mobility work, basic gymnastics, stuff that seems to really drive forward our athletic population outside of Crossfit.



Brad Davidson: Yeah. The one thing I think with women, maybe the biggest catalyst for – I did notice that a lot of the women out there were carrying fat on their legs still, even at the high level competition. I believe the adrenals are put in a position creating a progesterone steal. So they're actually probably having progesterone deficiency so it's creating more of an estrogen dominant state in them.

My feel with the CrossFit females, the athletes, if you really put them on a good estrogen detox and do what I do to support their adrenals so it's not robbing progesterone. I would almost venture to guess it'd probably happen with a lot of them with the stress they're under.

Robb Wolf: I totally agree. It totally makes sense. Would you ever find a situation where you end doing a topical progesterone or oral progesterone for a training block to try to patch that hole even in amendment?

**[0:35:00]**

Brad Davidson: Yes, I like that but I will always bring a doctor to play for that one. Progesterone is good a little bit. So I will always bring in one of my doctors to help me with that part of it. If I have to go above and beyond, like if somebody has incredibly low morning cortisol levels and I thought he need a supplement cortisol or I feel like progesterone is still going on a low progesterone, I will always consult a doctor first; run some labs on that and that one I feel could get a little clutch and a little out of whack.

Robb Wolf: Okay, okay.

Brad Davidson: Sure, I will for sure do that.

Robb Wolf: Okay, that totally makes sense. What do you feel like most women, you know, so you're mentioning maybe in this CrossFit scene just the very nature of the sport. It's so demanding. There's so much volume. There's so much intensity. We probably have a selection process that the people just genetically who are able to withstand the highest workloads are the people that are kind of maintaining – you know, they're the ones that are making it through the regionals and going to the games and stuff like that.

What else do you think is – so beyond the genetic selection process, you know, that taken out of the picture, what do you

think people are doing wrong nutritionally, lifestyle wise like whether they want to be lean, whether they want a higher athletic performance like if you were to order out like 5 things that people are, particularly females, are just consistently doing wrong and these are the things that you're just resetting again and again and again.

Brad Davidson: In regards to like a CrossFit athlete or just in general?

Robb Wolf: Just in general. Maybe if you've got the different – if you've got a set of problems in the physique community that you don't see in say like you're athletic community for example or if you see these problems across the board and you know, like not enough attention with sleep, GI issues, you know, like what are some real consistencies there?

Brad Davidson: Right out of the gate, they're not eating enough protein.

Robb Wolf: Okay, what do you usually recommend in protein intake? You know like grams per pound of body weight.

Brad Davidson: So if they're really athletic, I like to go 0.8 in body weight.

Robb Wolf: Okay.

Brad Davidson: I know that's a fewer than high. It's a little bit high but I just find it works really well. So I see a lot of that. I definitely see lot of constipation issues that women don't want to talk about. When we have a woman coming in here, that's something we get real friendly about; a lot of conversations about that because that's where estrogen's leaving the body. So if a woman's not going in the bathroom, there's a problem arising right then and there.

So that's the second biggest one. Third, women don't understand all the xeno estrogens that are in their lotion, their perfume, their shampoos. So we have real big discussion with high level athlete. Any type of a physique matters or performance in the body matters, we have a real big conversation. I always send them to EWG.org to rank their products to make sure that stuff's out.

But the big ones that I see in the chemicals are DBP, DEP, DEAHP, BZBP and DNP. Those are the ingredients you want to look for that are most dangerous or anything that has paraben after it. That's amazing how fast... Mark Schauss is a guy that I was

introduced to through Charles. I took a seminar with him on toxicity.

He believes a large amount of toxins coming in are through solvents. The stuff we're putting on our bodies. So that's always a top 5 thing. After that, it's always an inability to detoxify estrogens appropriately, so we'll always use Dimavale, you know, sulforaphane products, to really help aid in the detoxification of the estrogen.

Most women just don't understand that. I think every man, woman and child today has to be on some type of estrogen detoxification product every day because we're just bombarded and then 5, sleep's always an issue.

In my opinion, I've learned you know you have a liver toxicity issues when you're awake between 1 and 3. You know, it's kind of the Chinese clock for liver. I find when people, especially women when they're awake between 1 and 3, they're livers are overly burned with xeno-estrogens.

Robb Wolf: Got you. Okay.

Brad Davidson: So those are probably the top 5 top things that I see across the board. There's at least 3 out of 5 in every woman coming in.

Robb Wolf: So basically, inadequate protein intake, not functioning digestion so that they can get out these xenoestrogens either endogenous xenoestrogens, getting outside estrogens via like hair care product and stuff like that and then just generally not using some sort of a detoxification methodology.

Brad Davidson: Correct.

Robb Wolf: Okay, I like it.

**[0:39:59]**

Brad Davidson: Yes, we've got to find the source of the problem that are slowing it down. Usually it's the stuff in our environment that we're putting on our bodies. That's loading us up in my opinion.

Robb Wolf: What would be two, you know, maybe a couple of go-to products that you would recommend and what are they doing for the this

estrogen detox thing and maybe this would apply to both men and women?

Brad Davidson: My favorite product across the board is a medical food by Metagenics called Estrium. The product basically – it covers everything; complete support of estrogen production transport, metabolism, binding, detoxification, excretion, you name it. Every problem you can have in the metabolism of estrogen is going to be dealt with by this product.

It's phenomenal. I use it. Every woman I make take it. I try to make all my female athletes and physique clients do a cleanse twice a year and that's to be the base product in the cleanse. So that is always my staple go-to across the board. I think it's the most complete product out there.

Then after that, I'll start getting a little tricky. I really like a new product by Xymogen called Hormone Protect. It's a combination of DIM and sulforaphane so DIM really helps balance out the 2-hydroxylase and 16-hydroxylase and just make sure that the process works real well and the sulforaphane is a great phase II detoxifier so it actually helps get the product out or get the metabolites out of the system so it actually helps finish off the release of the metabolite after it's been processed. That's a phenomenal product.

And then what I really like, it's called DIMension 3 by Xymogen and again it's a DIM product mixed with Curcumin.

Robb Wolf: Oh nice, okay.

Brad Davidson: Yes, I like the Curcumin. It just has an inhibitory effect. It really protects against and so does the sulforaphane, against the oxidation of the metabolite, the hydroxylase whether it's two or 16 so it's another nice product thrown in the mix. Those are probably my three most staple ones that I use.

The other thing that I found, Charles showed me this one. EPA fish oil is really, really good for this. So every woman should have a lot of good amount of fish oil predominantly EPA if you're having an estrogen issues.

Robb Wolf: So is that going more for like in inflammation modification with the EPA or what's the activity going on there?

Brad Davidson: You know what? Let me – I just formed this up. I made a note of it because it's just something I forgotten about. I knew there was a reason I used it. I couldn't remember the clinical reason.

Oh so, basically Omega-3 promotes proper estrogen metabolism so it helps prevent the metabolites from going down the 16 hydroxylase pathway. It promotes the 2-hydroxylase pathway.

Robb Wolf: Got you.

Brad Davidson: It's basically EPA based. So it's mostly helping that.

Robb Wolf: You know, I've been all over the place on my fish oil recommendations, like for a long time, especially after I went to the BioSig deal like if somebody was really sick, really overweight, really inflamed, I was recommending like, you know, the kind of Poliquin standard like a one gram per ten pounds of body weight and then my friend Mat Lalonde, and some other folks, they did some tinkering, some research and it kind of looked like that level of intake was maybe above and beyond what the normal enzymatic process of just accreting omega-3s into the cell membranes.

Like we're basically pumping a bunch of that through the liver and getting it oxidize because we couldn't pump it through the system. So there wasn't a way to goose it faster through the system like what type of dosages are you recommending to folks.

Brad Davidson: I actually some of that research you're talking about because I was pretty hard core of the gate you know doing as much as possible. I have since backed off. I do about 3 grams a day with people just to be safe.

Robb Wolf: Got you, okay.

Brad Davidson: I supplement with 3 grams of fish oil and I really, really push grass-fed free-range meats to really basically bring in more of the omega-3s.

Robb Wolf: Right.

Brad Davidson: Yes, I haven't found the exact that I'm comfortable with. There is certain format that I like so I just – I found 3 grams across the

board to be really safe so that's what I stick with right now and it's so effective. I like how effective it is.

Chris Espinosa: As a side question, do you either of you guys have like a max level like you should never exceed as far as fish oil because I'll be honest, the back and forth on that has gotten me on a lot of trouble with clients and people who push fish oil, the companies and such.

Robb Wolf: I mean, you know, the stuff that Mat tracked down for me which I feel kind of goofy that I've never thought about looking at just basically is the rate limiting step for the introduction of these lipids into your cell membrane. What you're really, that's really the most important piece to this because once they get incorporated into the cell membranes, then they can start having biological activity on a cell by cell level.

**[0:45:18]**

Robb Wolf: And it tops off pretty quickly like you saturate that enzymatic process rather quickly and I think it seems like, you know for like a 170, 180 pound person to probably like 5 grams total a day, something like that is going to make an input on that and I think it's still some stuff to do some additional tinkering.

But just the thing that was, you know, concerning about that whole story is we were, you know, if you've got a metabolically broken person, they're already just in a pro-oxidative state and they tend to have low glutathione and so, you know, all the normal protective mechanisms that they have for dealing with advance glycation end products and reactive oxygen species, that's already impacted.

And then if you throw a bunch of the equivalent of like linseed oil, only even longer and more reactive into the mix, then it just potentially isn't all that good and the, you know, it's interesting though like Charles is a brilliant guy, very serious, super smart dude. You know, both of them have made recommendations of upwards of 20 grams of pharmaceutical grade fish oil a day for specific acute inflammatory issues.

And I believe that they felt like they were getting some good therapeutic benefit out of that so it's still kind of nebulous for me, you know, like what.. do you have an acute phase scenario that benefits from this and if it does, what's the mechanism? Because

it doesn't seem like we, you know, when we know this is a piece meal accretion of omega-3s into the cell membranes and then those then start affecting like the eicosanoid, you know prostaglandin, leukotriene processes.

I'm not exactly sure what's going on with that and I've read. Any thoughts on all that? Or is it –

Brad Davidson:

That's above and beyond me. I've tried it whole. I've gone the high-low. I never had a problem with it. I've even got great results with it but at the same time, I've seen the opposite and then it talks about what can go wrong so I have since backed off. I loved Charles information. He can run circles around me with that so I've never challenged him on it.

So I'm just sticking with the safe road until I find some better information. Like I said, I stick pretty much across the board about 3 grams. I will push 5 grams here and there with my guys but yes, that's pretty interesting stuff. It's an interesting debate.

Robb Wolf:

It really is. This is one of these things where I see an interesting dynamic tension between the academics and particularly like there's a number of people and a number of websites where people just fucking spin and pontificate and look at research and they try to hang their hat exclusively on that which and then you've got the other side of this where you have a lot of practitioners, people that are actually in the trenches working with people whether they are physicians or a strength coach and you have two very different stories going on.

You know, in the practitioner scene, you have people clinically using pretty high dose of omega-3s and getting apparently some pretty good result with this like even tracking a systemic inflammatory markers and stuff like that but then you've got the other side of this with the academics saying, "Woah wait a second. You know, we've got some accretion issues. We've got some enzymatic saturation issues. You shouldn't be recommending more than like 2 to 5 grams a day in particularly in like chronically inflamed individuals."

So there's more to the story for sure and it's definitely like Brad said it's over my pay grade at this point like I don't know where else to go to really make sense out of this thing other than if we get like a randomized controlled trial where we've got a group of

like type II diabetic individuals, you know, with high fibrinogen, high c-reactive protein.

You know, some other markers of systemic inflammation and we put them on varying strata of omega-3s. You know, like 20 – the ten gram or 1 gram per ten pound of body weight, half of that, a quarter of that, a tenth of that and we kind of see how that all turns out and that's going to be a massively expensive endeavour and maybe wouldn't tell you all that much. I don't know. It might but there definitely seems like there's something more going on with this, yes.

Chris Espinosa: Do you guys think that the quality of the fish oil versus the quantity is a difference in these studies and with people doing this at home?

Robb Wolf: I don't know. Brad, what do you think on that?

**[0:50:03]**

Brad Davidson: I'm always a fan of quality. I have learned the hard way a lack of quality can cause a lot of damage. So, for me, there is only three places that actually create fish oil that you can buy from. I don't know. Just tell people, look, get the highest quality possible, go with one that's third party tested and is badge tested and it will put an insurance policy on your name if something goes wrong with that product. That way you're safe. Everybody's safe. That's what I personally stick with.

But in regards to how much of a difference does it make? I don't know. I haven't really seen in any studies that show the difference between a high level fish oil and a lower levels fish oil and what's more effective, what's not. I always just play safe and go high.

Chris Espinosa: Yes, and that's a trick question on my part. I've seen people take a low end grade like you can buy from CVS and even like 7-11 type fish oils and then like higher grade like stronger, faster, healthier and some other ones, and the difference in loading is completely night and day from what they get the benefits out of and stuff.

I know like Berardi and Poliquin, I know they're recommendation is for like 1 gram per percentage of body fat. Now, so if you're 20%, you'll be running 20 grams but actually like Brad said, I haven't seen any problems like research study in a lab that people



are coming back with negative effects from taking high dosage of fish oils.

Robb Wolf:

Right, yes. I mean, Brad, if we were to look at some lab values, I mean the main things that I would be thinking like lipid peroxides, systemic inflammatory marking. Although, some of those things like one of the main modes of action of omega-3s is immune suppression like there was a – God, there was a study three years ago where they actually did a successful organ transplantation without immunosuppressant drugs and they had people on like 30 or 40 grams of fish oil a day.

Like that, it was so immunosuppressive they weren't even using a conventional meds. So, you know, you can have an effect here where you're really medicating systemic inflammation from like the c-reactive protein side, maybe even the fibrinogen side but then we might have some increasing oxidative stress I guess would be the potential downside with that.

So maybe looking at peroxides, circulating glutathione – could you, Brad, what else could somebody look at if they're doing a high dosage fish oil protocol and doing some lab work that they might track?

Brad Davidson:

You know, I just saw and I'm trying to hear you. I just saw and there's a new – I don't know if it even runs the lab. You can do a pinprick. It was designed by William Harris. A pinprick and you can actually test your percent of EPA, DHA and what kind of saturation you're getting from it so that's kind of an always simple one that I ever use to run to see if the levels I'm giving are doing anything; I'm getting too much or not enough. I'll try to find the name of it for you. Oh, it's called the HS Omega 3 index test.

Robb Wolf:

HS Omega 3 index test, okay cool.

Brad Davidson:

Yes, it's a pinprick. You can do it at home. I think it cost around a \$100. Basically it's a pinprick. You establish a baseline and then it basically gives you personalized EPA, DHA recommendation about what you have, how much you should be taking. So it's something I'm actually looking at. I mean you test every four months and to see what the status of your omega 3, EPA, DHA levels actually are in the blood.

Robb Wolf: I'm shaking my head vigorously right now because I'm just wondering why I went into educating people and trying to convince them to quit eating donuts instead of creating diagnostic medical kits.

Brad Davidson: [laughing]

Robb Wolf: Damn it. What was I thinking? Sorry, man. Just a diversion there. So that would be a good baseline to establish. Okay where are you? You're taking 2 grams a day and you're not getting any budging on the EPA, DHA ration in your red blood cells. You're using a low quality. Now, you're stepping up to a higher quality, same gram dosage but we start getting some improvements. That may be a way to track it, yes.

Brad Davidson: If it works. Like I said, I learned about it from Rob Rakowski. He likes to use it so I just started pulling information on it. I was going to try it out so.

Robb Wolf: Cool. Hey man, you know we've had a number of questions on the PCOS endometrium side of things like my level of understanding is super rudimentary compared to what I suspect where yours is. Looking it like sex hormone binding protein definitely seeing an estrogen dominance kind of gig mainly borne of insulin resistance at first.

**[0:55:06]**

Brad Davidson: Yes.

Robb Wolf: You know, like people come in and they are overweight. Just the fact that they're carrying more fat mass than we're getting aromatization issues, testosterone converting into estrogen and stuff like that but what about once we've got a chick that's reasonably lean and probably insulin isn't the issue but we're still seeing like some PCOS and some endometriosis. Are we just right back to where we were at the beginning of the podcast? You know, like GI issues, detoxification issues. Do you think that's what's going on with these folks?

Brad Davidson: I think it's part of it. PCOS, that's the one area that – I know that you like one in ten women suffer from it. I haven't seen a whole lot of it. I've seen one woman that had it but she was already under treatment by a really good doctor for it. I mean she looked incredible, had, you know was managing it very well.

But, you know, the negative was they had her on insulin meds, you know, controlling insulin and that's the only thing that I disagree with, but god man, all I can find is managing the insulin. That's probably my least spot of expertise in this realm of dealing with women.

Robb Wolf: Interesting, okay and you know that the primary thing that they put them on is Metformin which, you know, interestingly with this, Metformin we know for sure modifies insulin sensitivity at the liver, at the muscular level but you know Brad I did a blog post on this a while back. I'm pretty geeked on like this systemic inflammation, gut irritation and all that stuff and I was just kind of looking at it really Metformin is kind of a badass little drug. It does a lot of cool stuff. It seems to have reasonably low side effects and I always just kind of think, "Wow, this thing really is powerful at modifying insulin sensitivity."

And so I started doing some digging around and Metformin also protects against the effects of LPS causing aquatic toxicity so like the non-alcoholic fatty liver disease from a systemic inflammation and gut permeability and all that so it seems to have activity both on the insulin side of things but it also seems to have some effect at mitigating intestinal permeability and all that sort of stuff.

Brad Davidson: That was this lady was on. and I was, I mean, it managed everything so well. The PCOS was never an ordeal.

Robb Wolf: Okay.

Brad Davidson: She looked unbelievable. Especially, she was like 43. She was lean, incredible looking. She's actually married to a big time doctor as we all know and has actually become a health coach. I mean she would never know she's dealing what she's dealing with.

Robb Wolf: So I mean it still seems like probably the PCOS endometriosis somewhere in there by hook or by crook, we've got an insulin disregulation issue and something that can never remind people enough of, you can get the equivalent of a type II diabetic insulin resistance state from acute sepsis like basically intestinal permeability or some sort of other bacterial infiltration that causes insulin resistance.

And so if that's going on or there's a, you know, just bad sleep or vitamin D levels. You know, looking somewhere around that systemic inflammatory spot if it seems like a good place to go when you're dealing with the PCOS endometriosis if you've already taken the steps of kind of low-ish carb-paleo and some decent training and all the rest of that jive.

Brad Davidson: Yes, I like that. It's a great idea.

Robb Wolf: Dude, we're at an hour here. I suspect we could probably keep you on the hook here for like a year but if you want to wrap it up here and then maybe we'll – I have no doubt that people are going to have just a truck load of questions and I'm probably going to have a truck load of questions also.

If you want to wrap up here and then maybe we'll put you on the books or maybe 2 to 3 months down the road and we'll bring you back on?

Brad Davidson: That would be great. I would love to have, you know, question people want answered. Like I'm really – it's so broad trying to prepare for this was the toughest things I've done in a long time.

Robb Wolf: Well, like I told you. The standards are low so you actually elevate them.

Greg Everett: What do you mean prepare?

Brad Davidson: I'm just trying to go back and re-learn all the physiology. When you're dealing with clients, they don't really care to know about all the back end. What it's doing is want to make sure it works so all you got to do is show them that it works and you're good so I didn't know what to expect on this so.

Yes, there's questions ahead of time. I would love to lay out example protocols of how I've done it in the past. I'm going to end the trenches. Everything I've presented, what I found to work, actually in real life with my ladies and with my clients in general so I would love that. That would be a lot of fun for me.

**[0:59:56]**

Robb Wolf: Brad, how do people track you down? Where are you on the interwebs and all that?

Brad Davidson: Yes, our website is [www.starktraining.com](http://www.starktraining.com)

Robb Wolf: Do you have any seminars? Do you have any information product? What do you have cooking on all those fronts?

Brad Davidson: You know, right now, I'm actually am a national speaker. I actually travel the world and speak to executive groups and the visage groups so I do a lot of speaking. I am prior for that and then basically, we're in the middle of creating this really nice nutrition supplementation program that we're looking incorporating into other gyms.

We have this really nice package that we present here and basically now it's really easy for us to take our program, incorporate it into another gym and have it roll. We're actually right after this, driving up to L.A. to meet with a gym but basically, right, we put our systems into play, it goes right to their clients; they collect the data; send it back into us. We design everything for them; send it back to give to their clients and give some access to, you know, we believe are some really high grade safe supplements that has insurance coverage.

I'm big on that. Now that, you know, process of some of the sport. There's more and more drugs I think going on. I like to be really, really safe with the products. You know, we give access to the people who has stuff. So that's kind of what's were cooking on right now. That's the biggest thing that's in the mix.

Robb Wolf: Nice.

Brad Davidson: Yes.

Robb Wolf: And is that something that I know people are going to ask – is that available now? Is it coming out soon?

Brad Davidson: That's available now, yes. We are in the middle of – we have approached three facilities were working on so it's in process right now.

Robb Wolf: Okay, cool and folks can track that down at the starktraining.com?

Brad Davidson: Yes, so the new sites – we're just finishing up our shopping cart. We're finishing up our new section. Focus a little more on this. It should be up within the next week so hopefully, if it's not up by

the day this is released, it will be out within a couple of days on there so it's almost done.

Robb Wolf: Cool, and you know when the new site is done, I followed you on Twitter so just ping me a tweet to let me know that the new site's ready and I'll ship that out to folks.

Brad Davidson: Great, that sounds great.

Robb Wolf: Cool, man. Greg, can you think of any – Greg, Chris, can you guys think of anything else or whatever or wrap it up for this one?

Greg Everett: I'm good. My brain is full.

Chris Espinosa: Yes, I'm raw. I just learned so much which is why I want to be on this things on the first place.

Robb Wolf: Very good, man. Well, Chris, for putting this thing together man. You were the inspiration and the glue on this gig so thanks for doing it.

Chris Espinosa: Yes, I hitched you up about the testosterone a long time ago. There's so many question about the supplement side. Everybody wanted a quick fix and then I just saw so many comments about the ladies asking when it's their turn so I figured you know what I see Brad working some amazing clients who get some amazing results so I figured like this would be a go-to guys as far as women and estrogen in particular so I'm glad that hopefully we have a box for that to be in now.

Robb Wolf: Yes, and you know when I think this things through like why I decided to focus more on testosterone and be surrounded by a bunch of like hairy dudes instead of becoming like the estrogen freaking guru and then you're just surrounded by a bunch of like super hot chicks like Brad, touché man like –

Greg Everett: Rookie mistake, Robb.

Robb Wolf: You saw through that early on man. I am bummed so yes.

Chris Espinosa: I think you have more potential to probably get your ass beat by the ladies than the guys, you know because the guys get more depressed with the low testosterone, you know their strengths down; they're not as angry and then the women, you can get

choked out in a heartbeat if you take carbs away or, you know, with any of the hormones on them so.

Robb Wolf: People pay good money for all of this stuff if you just delineated there man. There's all websites devoted to those genre.

Chris Espinosa: Oh, yes.

Robb Wolf: I don't see a problem with that so. Well cool guys. We'll wrap it up here. I know Greg's got clients rolling in. Brad, huge honor having you on this show. You crushed – you elevated standards. Greg and I are going to actually have to not be slap-dicks here from the outset

Greg Everett: Yes, thank man.

Brad Davidson: Hey, it was an honor being with you guys and I'm really excited with both of you. This is really a fun thing for me thank you so much.

Robb Wolf: Awesome man, so we'll see what type of questions we get and we'll plug you back in queue maybe two months down the road and bring you back on.

Brad Davidson: I look forward to that. That would be great, thank you.

Robb Wolf: Awesome man and Chris will bring you back to since you're just generally the pesky ankle biting instigator in all this so.

Chris Espinosa: I am the troublemaker man. You have to ask my mom about that but hopefully me and Greg can try meds more next time.

Robb Wolf: Awesome, cool. Maybe we'll, you know, talk a little bit of training philosophy next time to so. Okay, guys we'll wrap this one up and we'll talk to you soon.

**[1:04:48] End of Audio**