Sigma Nutrition Radio - Episode 43

Hosted by Danny Lennon with Guest Speaker: Mike Israetel

Total Time 01:09:21

Danny: What is going on guys. We are here at episode 43 of Sigma Nutrition Radio. Thank you so much for taking the time out of your day to listen to the show, it really is appreciated and as I always try to do I'm trying to give you back that value for your time which today I'm pretty certain you're going to get.

On today's show I'm going to be talking with Dr. Mike Israetel of RP and we're going to be talking about the topic of nutrient timing. We'll more specifically dive into some things around protein timing and distribution, where to place carbs throughout the day, basics to keep in mind around nutrient timing. We'll also look at in the grand scheme of things how much actually plays a role and who that plays a role for and we'll also take a step back and look at, kind of big picture stuff for body composition and for performance and really kind of highlight the people why there is such a prevalence of people focusing on the small details that don't have too much of a difference. So this is probably one of the more important podcast to listen to if body composition is a big goal for you or you are a athlete or competitive training who wants to optimize body composition as well as performance. So before we dive into the interview I'll just give you a bit of context on Dr. Israetel for those of you who haven't come across his stuff before.

So he's got PhD in sports physiology which he got from East Tennessee State University and while he was there he also serves as a strength coach and a sports scientist who various division one athletes of all different sports. Now his educational background is really well complemented by his experience both as a coach but also as an athlete himself. So he's being a competitive power lifter, a grappler, a body builder, he's done nutritional training consultation for elite Strength, athletes around the world, combat athletes but then also he does a ton of work on the academic side which is a great balance. He's currently the Assistant Professor of sports exercise science at the University of Central

Missouri. And I suppose in addition to that on his coaching side of things he puts out a ton of great content and I'll mention more of this stuff later on in the show and also link up in the show notes but he is the head science consultant for RP. He writes really frequently for Jog or not training systems which many of you all know and he has authored a really, really good book the Renaissance Diet which I will talk to you more about at the end of the show.

It is one that I have read and I think is one of the best breakdown of how to simple think about eating or your body composition and it is not a BS book we see making these big massive promises of radical transformations we see in a few weeks. It's very simply very realistic on if you want to make body composition change in the long term, this is how you go about doing it and it lays out a very good system. I'll let Mike talk about that toward the end of the show but really in this specific episode like I said we wanted to dive into just one aspect of that and that's nutrient timing. There's a lot of talk in the fitness industry right now on protein dosing with the optimal amounts to dose with and what's the best distribution of over the course of the day, what kind of threshold needs to be hit, how does that relate to the train window and then on the side of carbohydrates we have is there a best way to distribute carbohydrates. Should we put them more of one end of the day opposed the other, should we split them evenly, should we just have the training and so there is very different interpretations of the best way to do things for the whole different angles. So I wanted to bring Dr. Israetel on the show was to...well let us look at this from a physiological point of view and what is the main body of evidence tells us on this topic and read then practically what we see. I mean Dr. Israetel works with so many guys who are absolutely jacked doing phenomenal mounts of training. The guys who are on the extremes of body composition and so when you combine that with the science to come through with a pretty good conclusion. So that was the whole point of the show today, so hopefully the stuff that comes out is worthwhile. As I've mentioned before I think Dr. Israetel is brilliant, in not only his way of laying out information but the way you see him critically analyze stuff. He's one of the few people I always look out for what he says and I have a huge respect for respect for him. I think you'll really, really like this show, I think you'll take a lot from it. With that in mind let's not waste any more time listening to me let's dive into the interview this week with Dr Mike Israetel...

Hey Mike welcome to the show. So great to have you on, how are you doing my friend?

Mike: Thanks Danny I'm doing really well. Actually truth be told I'm getting over being super, super sick and I'm also really busy but the busy stuff I can't complain about but the being sick is certainly not much fun but I'm better than I was last week so I'm chalking it up to something good.

Danny: That always sucks and with that in mind just thanks so much for being able to take time out o your day to come on the show especially with all that going on. So first Mike before we dive into anything nutritional training related, I think I'd love to give people some background context to how you've arrived at this point in your career and kind of your main interests areas as well by bringing them through a bit of your journey. So are there any milestones or turning points or events that kind of come to mind that you think has shaped you as a coach, as an academic and just overall as a person as well?

Mike: So I was actually rescued from a Pacific island when I was six years old and I only spoke fluent Japanese at the time, just kidding that's a shout out to American Ninja which is one of my favorite movies of all time, it's hilariously bad, I encourage everyone to see it. So I'm originally from Russia which I'm not sure how influential it is on anything, I grew up in Suburban Detroit area and I attended the University of Michigan for undergraduate in movement science which is a sub division of kinesiology. And I was like a really good general science education but the entire time I learned almost nothing about how to train people or athletes or lose fat or build muscle. We just learn basic kinesiology and that was a public service announcement and if someone tells you they have an undergraduate degree and exercise science that may or may not mean they know a whole lot of anything about applying training principles, I sure as hell didn't and at the same time I was getting into power lifting, I started competing in bench pressing competitions and then in full means and as I became very curious about how to enhance my strength in the best manner possible and I was deeply devoted in high school as well and of course in college to scientific method. The scientific approach I knew that science was the best possible path to the truth, certainly the most likely to arrive at the truth of all the different ways of knowing and I began really consuming scientific literature related to getting stronger, getting leaner, building muscle and all of that kind of stuff which lead me to enroll in a master's program at Appalachian State in North Carolina which was a very good experience but a lot of the much deeper theory was taught there. Still not much applied to actual sports science which is defined as the science of actually getting people in athletic shape, enhancing athletic performance, getting people jacked, lean, etc. and then I went to work as a personal trainer in New York city for a year. It was a very, very fond experience. I got to meet a lot of incredibly wealthy and intelligent and awesome people but I

realized as a personal trainer I was kind of limiting the ability, the maximum ability of my brain to be working. I knew I was really into using my brain as much as possible and I realized I was already kind of academically and I had a masters degree, I was academically over qualified to be a personal trainer. Not that it's bad to be more educated as a personal trainer but if you are to attain a certain level of education you could probably soon do a little but more of brain intensive than just being a personal trainer.

So I realized at some point during the year that I worked there that I needed more education. I was not satisfied with how much I knew and I was accepted to the PhD program and its inaugural year in PhD program in sports physiology at East Tennessee University under Dr. Stone, Mike Stone who is kind of a legend in sports science, 250 plus publications, has been head physiologist for the US Olympic Training Center. His resume looks ridiculous, like some sort of a joke you would make like....you'll make the ideal CV, that's pretty much it. And so I got a chance to learn from him and his wife Meg Stone for only Meg is a two time Olympian in the discus and they essentially started this PhD program and they attracted students that already knew physiology, they already knew the basic science but they wanted to learn actual sports science. it is currently, at the time it was the only sports science PhD program in the United States, now it's one of three or something to that extent. There is a couple other ones in the UK, New Zealand and Australia but it's a very rare thing to actually get a PhD in sports physiology or sports science because people ask me what I'm an expert in and my expertise isn't taking good athletes to making them better, it's not in fixing injuries, it's not in exercise physiology, it's not in health molecule, you know molecular signaling pathways of resistance exercise in rats occurs, its taking human beings and making them bigger, faster, stronger, leaner, etc.

So that acceptance to East Tennessee State work with Dr. Stone for three years got me a chance to be head nutrition sport nutrition consultant to the US Olympic Training Site that was there for weightlifting. We had Olympic caliber weight lifters. I got a chance to help them make weight with their diets, etc. I got a chance to teach and I got to learn pretty much almost everything I know from Dr. Stone and his colleagues there and I learned a lot from other students there that are now professors alongside me at various institutions and it was just an unbelievable experience because for the first time in my entire education I actually learned applicable stuff. I came to class everything single day and I knew more about how to train athletes, where as my undergraduate masters every single day I knew more stuff but I didn't exactly know how to connect it to the grand scheme of applying it to athletes. I'd say if you're looking or turning points PhD program for physiology revolutionized my entire approach to everything.

Danny: Yeah, that certainly is a fascinating, sort of journey through it and it certainly definitely to me because I know the stuff that you put out it makes a lot of sense because you mentioned for example the scientific method and how that became a key critical thinking piece for you to base things on and that certainly shines things on your work which I think is something more people who are putting out information should be respectful of when they are giving out advice to people. So with that in mind I certainly went diving to more of those topics throughout the show but if we pull it back for a second when we're talking about most people's goal when it comes to training especially in the general population it's going to be around body composition change. So when we're considering that I think you have a really, really good way of presenting this clear order of importance that people need to focus on in terms of what are the big picture things and what other things you can worry about later on because as you point out most people start focusing on the small little details that don't have much pay off as opposed to big pieces. So can you perhaps just briefly just summarize that for people. Those kind of five components that you lay out as the order of importance to keep in mind with body composition and goals.

Mike: Yes, so like that's on the dietary side. There are a couple of important things to say on the training side which I can absolutely do later if you'd like but on the dietary side it actually is the most important so long as your training hard there are probably five basic categories of input to your diet that you have control over but they are not all five equivalently sized in magnitude, some of them have a much bigger effect on how much leaner or how much muscular you get than others.

By far the most effective dietary manipulation you can exact is calories. If your goal is to get bigger muscles you have to eat more calories than you expand if your goal is to get bigger muscles in the fastest most efficient way possible. If your goal is to lose as much fat as you can or your goal is to lose fat in long term to a really extreme amount, you have to eat less calories than you burn and these are hugely powerful things and diets that don't control for calories are taking away THE biggest weapon that you have in body com-positional alterations so long as you get your calories right. That might account for up to 50% of the variance in any diet so far discovered. So you can eat Twinkies all day but if you don't eat enough Twinkies you can still lose weight, as a matter of fact you'll still lose weight. This diet has been replicated by a colleague of mine, I believe the University of Kansas and he was the department chair, the head professor of Dr. Jennifer Case who works for Renaissance the company I consult for and he did something called the Twinkie diet where he ate most of his calories in Twinkies, he had a little bit of skimmed milk and some vegetables to fill out his protein and micro nutrients requirements but he ate mostly Twinkies and he lost a bunch of weight, he lost a bunch of fat and his cholesterol improved and a bunch of people, you know

everyone got pissed, not everyone but a lot of people got pissed and he was just illustrating calories and (16:05) and that was massively, massively important.

Secondly, okay so you got your calories taken care of but you want a bit more of an advantage, probably another 30% advantage comes from taking in the right ratio of macro nutrients. So in particular meeting your daily protein needs is very important for gaining muscle and losing fat without losing as much muscle as you otherwise would have. Eating the right amount of carbohydrates is important and of course getting in the right kinds, I'm sorry the right quantities of fat is important as well. Protein is the most important of all those, carbs second and fats third. That together so if you take the calories and calories out plus the macro nutrients you probably account for 80% of all the variation and diets effectiveness, so that recent trend, I don't want to call it a diet or Allen Ergon is a very good guy who I personally know and he hates it when people say I half way as a diet if it's a macro, it's a clouded diet, it's something people on the internet started saying but just attending to your calories macros is a supremely effective approach with 80% of all the variances huge. So if you're going to give people who are just regular people on the street, you know how many times, you're a fitness professional, I'm a fitness professional, how many times do people ask us hey what do I do to lose weight, what do I do to get big and people ask us that stuff all the time. The best answer to give them is say look if you want to gain weight eat a bunch of protein and eat a lot of calories and that's 80% right there with what they could have done.

If you say, somebody ask you hey how do I gain weight you say listen you need this supplement, well we'll get to that in a second as to how much variance that accounts for, it's a very tiny amount to your leading people astray because they could be getting everything else wrong. You need to think of the supplementation right that could be way, way behind in their goals. So calories and macros together account for probably about 80% total then another 10% is accounted for by nutrient timing. So exactly when you eat your protein, your carbs throughout the day, do you have post work out shake, do you do lower carbs on non training days, spread throughout the day or do you have one big carb meal, that's all covered in nutrient timing and nutrient timing can be sunrise is falling. If you're looking for a very big advantage, if you're really looking to optimize your approach for example if you are a competitor of some sort, if you have a body composition goal in which you are going to be taking into a body building show or a fight or any kind of, if you are an endurance athlete and you have a perfect race weight, they don't want to carry around extra fat, if you're not just doing this to feel look good and feel good, nutrient timing is worth considering because it does have an effect but that effect isn't at most 10% of the variance of diet. So if someone says listen I got a diet for you, if you just eat certain foods at the right times you're going to get jacked and lean that' bull shit. It doesn't work like that, so 10% errand means it's a small effect but it's worthy.

So for example there has been a recent trend of people saying timing doesn't do anything. That's first of all empirically false because there is lots of research that says, as a matter of fact the amount of research says timing does have a factor but also it depends on what your goal is as to how much of a change you'll see. If you tell a competition body builder look timing doesn't do enough for you to care about, you're talking the difference of the that body builder getting first place and fifth place. You think any body builder in the world is really comfortable with that. You know like why you still look jacked, I mean yeah everyone on stage looks jacked that's not the point.

So if you're looking for more detail oriented timing is definitely a good consideration. The next 5% is occupied by something that maybe one of the most over trumped in common media, sources of body composition enhancement which we call food composition and it is what kinds of proteins are you eating, are they more animal proteins, are there more plant source proteins, what kinds of carbs are you eating, are you eating low glycemic whole grains and in fruits or are you eating mostly fruit loops and Gatorade and lastly what kinds of fat sources are you taking in? Are you taking in coconut oil which supposedly heals aids and cancer now a days if you read enough people or are you taking in bacon grease and trans fats and all those stuff. All those factors together, all three nutrient compositions account for probably about 5% of total magnitude of body composition change. Tiny, tiny amount and you know this as well as I do there's a lot of people looking online for articles of what to eat to get jacked and lean, always looking for special foods. Even the ridiculous viral marketing where they have one food that kills belly fat, you know apparently causes cell death which is curious, I'd like to see data on that but it's always you know just one special food will...one of the first rules of proper sports nutrition for body composition that there are no magic foods, they clearly don't exist. So if you're still looking for them, you're looking in the wrong place, that just doesn't happen. However, if you are very seriously involved in competition, if you are very seriously involved in physique sport especially, you can't just eat cheerios or fruit loops for every meal of the day and expect to look your absolute best. Now you look really good but at some point looking really good just doesn't cut it. So there are advantages in food compositions, types of proteins you eat, types of proteins you eat, types of fats you eat, types of carbs you eat but those are very, very small advantages. Small still means there real but they are just not going to make or break. So if you have an aunt that's well you know I'm eating all my you know, I'm on the lamb diet. Most of my meat is lamb because lamb is really high and healthy fats, you might as well start rolling your eyes right there because if she's eating lamb diet and she's eating five on top of that every day it's not going to make a hell of beans difference where she gets her protein or anything like that.

Lastly and also again very over touted is the roll of supplements. So turns out there are only very small number of supplements that have reliably shown to do anything and secondly even those supplements that are reliable they really just don't have this gigantic effect. One of them was common things I hear is “yeah I took creatine but it really didn't do anything for me”. How do you know that? You don't have the precise measurement tools it would take to figure out if creatine works for you or not. Creatine's total effect maybe one to two percent on performance or body composition unless you have a DEXA in your room or your laboratory to measure exact changes in body composition even with DEXA will be hard to measure the effects of creatine. So we're talking about these tiny little effects. Some people say well supplements don't work at all because they can't detect these effects even though science has shown the real and the opposite of when people say you know take creatine it will change your life, Yeah it isn't going to change shit. It's just going to be a tiny little advantage that you put. Creatine's really cheap, it's really easy, it has no side effects. So you can take it and it's going to give you that little bit of extra edge but little bit of extra edge means it's not really going to produce wonders so if you start taking creatine with the expectation that's going to change your life or if you haven't taken creatine because you totally think it doesn't work, both are wrong but that totally doesn't work as much closer to the truth than thinking creatine's going to change your life. Creatine with protein, casein protein, gatorade and other glycemic carbs, supplements and caffeine and other stimulants are probably the only things that really work. You can put a multi vitamin in there but that's more of a conversation on health rather than body composition.

So that's it there's your five categories and notice the calories and calories are always huge. Macro nutrient amounts and ratios are very important. Timing is less important but food composition and supplements are tiny, tiny details most people really shouldn't concern themselves with those things if they have really moderate to high body composition.

Danny: Yeah and that's massive. I think the reason I like that kind of break down so much is because just how prevalent is now that people are missing the forest for the trees and how bogged down and we can all tend to at times, I've done the same getting bogged down to the small little details that in the grand scheme of things aren't going to have all that much of a difference. So I think...

Mike: For sure.

Danny: ...having that actual, an order to it that we can keep referring back to and saying what am I getting number one and two in place before I start worrying about number three and four.

Mike: Certainly.

Danny: It's huge for people. So with that in mind it also reminded me of the same type of approach that another really smart dude that I'm now thankful to call a friend, Eric Helms who I've had on the show before. He has his hierarchy pyramid and exactly kind of the same approach to look at the big pieces of the picture and then calories number one and the way down supplements are going to be down that, down that as a small piece of that kind of pyramid. So I think when you start to see what guys at the top of the game that are actually looking at science have the same approach. Then you can start to see well yeah that is probably the way to go as opposed to these crazy diets at the extreme and when we look at these kind of the more fad diets they are doing precisely the opposite. They are focusing on supplementation and like you say like these super foods and that sort of thing.

Mike: Definitely. You know I've heard of Eric Helms numerous times and I've heard only very good things. I've never personally talked to him but it's not like we made this stuff up. I've never actually communicated with him and prior to talking to Brad Schoenfeld has a very similar list of priorities and up until when I found out that he had this list, is the first time I ever spoke to him in real life. So we arrived at this independently simply because it is something that you just discover from the literature and from applying these principles and that's a really cool thing I think is a good idea to mention. We're not just a bunch of scientists sitting around. We're also are, you know we don't just read studies and go oh this is the way the literature looks, like we've tried all these stuff. Like I'm a competitive body builder and a jujitsu grappler. I wish there was a supplement I could take that would revolutionize my diet and make me lose fat. I wish just eating special foods would make me lean and jacked and make my performance incredible. I hate dieting, being on low calorie sucks but unfortunately it's the only way to lose any meaningful amounts of fat.

So it's one of these things where we arrive at this from an initially empirically and scientific approach but it's been conformed on our lives and lives of our clients and everybody else for as long as we could remember and the thing about this is like you know you're on to the truth of something especially when it's not very palatable or pleasant. You know it sucks to tell people that calories are the biggest deal in the world. Nobody wants to hear that. It's kind of how you know if something sound too good to be true well maybe it is. But if something sounds plain and boring and simply you may be talking about the truth. One way I know that I'm eating a pretty good protein powder that doesn't have a bunch of fake filler ingredients and it take like shit. You if it tastes like there is no reason they would make us taste that unless they actually had to put stuff in there that they should have shown works.

Danny: Yeah, yeah.

Mike: They easily could have put in a bunch of filler and made it taste great and then they could have been on their way selling a bunch of products but I remember Nitro Tech protein powder from back in the day. Ton's of BCAA's, tons of leucine which of course completely tasted awful and you just knew you were getting a pretty good product. You with this little priority list it's like yes we're sorry we really don't have any real good news for anybody but unfortunately that also explains why most people are out of shape. If it were all good news then maybe more people would be in shape if there really was a super food, Danny don't you think a lot more people would be eating it. Acai berry or whatever the hell, avocado, coconut oil, depends on which you know five years time you look at there's been a bunch of super foods, alright everybody pretty much looks the same. I wish it were not the case but that's just the reality of the situation.

Danny: Yeah, exactly it. It's such an attractive option for someone especially if they've had a goal for a significant amount of time. It could be years that they've never had the body composition or health that they've been after and to be able to for someone to come out of nowhere and say well if you were only eating these specific foods and combining it with this specific supplement that would completely change and you get these massive differences. That is such an attractive proposition to someone as opposed to be told well you just actually have to focus on sleeping properly, training properly and regulating your intake to match what your goal is. So I think that's what kind of comes back though, just that kind of proposition for people, alright?

Mike: Yeah, one thing if I may go on a very short rant.

Danny: Please do.

Mike: You know what baffles me? Recently I've come to this sort of revelation that I've now been in the industry for a while. As an observer from my late teens, I'm thirty years old currently. So I've been around for 10/12 years, looking at what people eat and how they train. Just in a very general sense. So I've seen a couple of fads come and go. Dr. Stone my mentor at East Tennessee State. He was around for I don't even know how many years, maybe four years or research and training, maybe longer.

So he's spoken about the several times where abs and core training and all these other stuff, he's seen it come and go numerous times and to us this was baffling at the time because we've only been around in the industry for six or seven years and we thought you know when core training made a really big comeback in the mid 2000's we thought it was a big deal and of course Dr. Stone was like nah this is around like in the late 70's too. So it came back around and here's the real baffling part to me, I now know people, personally, I can't say I'm proud to know them but I know them that have fallen for every single fad imaginable in the last

years. Literally I know people that ate super low fat in the 90's, they ate high whole grain in the late 90's, they drank olive oil and smashed avocados in their faces in the early 2000's, they ate all the eggs they could in the late 2000's, now their guzzling themselves in coconut oil and bacon grease. Like we have people emailing us about diet and saying “hey what about coconut oil?” My first response was “what the fuck about coconut oil?”

Danny: (Laughing)

Mike: “You fell for every single fad there was. You really think that science changes that quickly?” It's just embarrassing. I almost want to ask them you know “what are you going to fall for next?” Do you know people like that? I'm sure you do.

Danny: It's like they're telling themselves that they now know something that most other people don't and I think that comes from these kind of gurus who are promoting this stuff. They are saying “well of course doctors don't know this” or “people in research don't know this they haven't seen the studies we have” or “this is just the conventional wisdom that they're told all along and they're blind to this stuff” and it's very easy to sell people on that if you have a very compelling argument as opposed to, especially for someone who's not as scientifically literate for example. Earlier I mentioned Eric Helms and in that show that he was on we dived into some of the issues around calories and macros, especially for people that are doing some sort of power lifting or body building type training. So with that I'd like to maybe just for a while just go into a bit more about nutrient timing and obviously you mentioned that calories and macros are going to have the vast majority of importance and nutrients are going to play a smaller role but at the same time I think nevertheless it does have an effect like you say and is a really interesting topic right now because there's some pretty cool stuff coming out on it. Now if he wants protein to get to continue to get to the muscles especially towards the end of and right after work out you should probably consume a fast digesting and very easy digesting protein powder or protein source which is usually a powder and a high glycemic carbohydrates source in order to get those nutrients to where they need to be because gastric outing is severely inhibited with heart training. So you need something very easy to get into the blood and in that case waits protein is a very good recommendation because it's a very high quality protein and its preposterously easy to d and any kind of glycemic carbohydrates paired with Gatorade and PowerAde or something like that also tends to work well but most, the way protein accretion or muscle growth actually works is it signal during the workout and then protein muscle building itself or the fracture of something creates the rate of muscle growth in that muscle you trained begins to steadily but surely rise over the next six to 12 to 24 hrs. as it peaks anywhere from 6 to 24 hours after depending on certain factors and then over multiple days it shreds back down until you have to train a so most of your muscle growth, as a matter

of fact almost all of it doesn't occur around the workout window as such but at a really special time it turns into hours and days afterwards. that's where you need to be is eating proteins is an around-the-clock not in a magical way around the workout.

Danny: Yeah and I think that's a great point because as opposed to the other two macronutrients, protein does seem to be the one that there is research showing about splitting it throughout the day. I think especially some pretty cool research over the past years coming from especially Stu Phillips' lab at McMaster and they have kind of been at the forefront of alot of this and I think there's one paper where they compared different proteins distributions as opposed to four evenly split servings of 20 g verses eight servings of 10 g and then a 2 x 40g. Basically the same amount but split in different amounts and they kind of seem to show that the 4 x 20 grams had the most beneficial on muscle protein synthesis. So that seems to maybe indicate that there is some sort of maybe threshold that needs to be hit? Again I'm not too sure whether that's just total protein or maybe it's just down to the leucine threshold. Any thoughts on that or do you think it's just a safe way to go to split it may be over four standard meals?

Mike: You know I don't know four is going to be the magic number but certainly probably within that range I think 4 to 6 meals or 4 to 7 meals is best for most people. The way I approach this is the research on it's very interesting and some of its very good, the direct research but it's a bit new or a bit fresh and it's just not enough of it especially not enough research to set aside. My curiosity about losing threshold and things of that nature, there's probably a losing threshold but you know if you just eat whole foods and mostly meats around the clock anyway you're going to meet your loosing threshold, no problem in any case. The real reason that protein timing in the sense of eating relatively frequently, not super frequently but steadily around the clock is that there are multiple lines of theoretical reasoning that say it's probably a good idea.

So protein normally digests a certain length of time in the GI tract or it most certainly only takes a certain length of time to release into the blood stream. When that is no longer happening you're going to be taking protein away from the sources most rich in amino acids in the body particularly if your very muscular and lean that means your muscle is very high risk for loss during that time. Your body is in a constant need for protein, especially if your growing muscle, those fractional synthetic great curves. In your pecks for example if your chest is sore they demand amino acids and they are going to get them one way or the other, whether by pulling from other parts of the pack or pulling amino acids out of your quads. So you end up just having what's called amino acids shifting, part of your body loses amino acids and part of your body gains amino

acids and that's not a very good thing because essentially our breaking down your own muscle to build your muscle in another place. There's no net growth.

Second, so first of all we're looking at that from that limitation. That it's a really good idea to get amino acids from the blood so you don't burn your own off. Then we have another idea that says does, so okay let's say if you eat a certain amount of protein. Let's say you eat, you have 200 grams of protein that you have to eat throughout the day. Is 4 meals at 50 grams of protein better or 2 meals of 100 grams of protein. Although two meals of 100 grams of protein doesn't solve our problem of muscle burning but we could hypothesize that the muscle we'll lose when we don't have protein in the blood stream can be completely regained and of course new muscle can be grown just by eating 100 grams of protein twice a day. And unfortunately Stu Phillips' research has not been kind to that idea. There seems to be some wavering of that but for the most part you supply all of your amino acids sources and after that the extra amino acids simplly oxidizes for energy or convert into body fat. Since you can't eat protein all day long and you have a massive 150 gram protein steak most of that steak is turned to fat and only just about 50 or 60 grams of it if your pretty muscular gets used to build muscle. So the question is what the hell have you been doing the rest of the day? We've been losing muscle and you're probably not going to get that muscle back.

So a sensible timing of protein, multiple high protein meals throughout the day. First of all have been practiced by strength athletes around the world for what maybe sixty years now and not to say that necessarily makes it true but it certainly doesn't help that everybody who ever has gotten jacked does that. Is certainly some kind of evidence, not the best but also the theoretical background of it is there is really no pathway that's going to grow back the muscle you lost over a 12 hour amino acid fast, it just doesn't exist.

Danny: Yes.

Mike: So Stu Phillips's research to me, people call it a revolutionary, to me it's confirmatory and it's exactly what we expect. Just completely obvious from if you just have a basic understanding of nutrition and pathways and proteins and metabolism pathways, that's what you would expect. One of the first thing you would ever learn in exercise physiology is that carbohydrates have a reserve store like glycogen in the body, fats have a reserve store in tissue but protein does not, there is no reserve store for amino acids. The reserve store is muscle. Unless you plan on losing muscle you had better be eating protein around the clock.

Danny: One more geeky thing I did want to ask about, because it's something that has kind of been in my head was around MPS, especially when we were talking

about a protein feeding. And we are obviously then getting a spike in protein throughout the day depending on whether we've eaten 4 meals or 6 meals, or whatever and if we're saying to people let's get a regular feeding of protein. So let's take a typical guy that's training. He might eating 5 times throughout the day that say 30/40 grams in a standard meal. So I wanted to ask about a possible refractory period when it comes to muscle protein synthesis.

So we know that net muscle tissue gain is going to be this constant tradeoff between muscle protein synthesis and then muscle protein breakdown. Now after a protein feeding we're obviously going to get a spike in amino acids availability and then these are going to be used over the next number of hours like your saying.

Amino acid levels are then going to drop until we eat again. Now what I've been trying to figure out is (and this is kind of something I think Tim Ziegenfuss of the ISSN mentioned a workshop that kind of kicked this off) is that dip in the amino acid availability between those two protein feedings actually necessary for maximum protein synthesis or for MPS to be sparked off the next time? So as in, is it fair to say that if you have four of these bolus doses of protein served over the course of the day that spikes up protein intakes, obviously muscles protein synthesis gets sparked off, then amino acids will drop back down and then when we eat again it kind of comes back up. Will that lead to more muscle protein synthesis over the course of the day as opposed to if we take a hypothetical situation of hooking someone up to an IV drip and constantly just infusing amino acids directly in to the blood stream, just very small amounts consistently over 24 hours, if any of that made sense what so ever?

Mike: It absolutely made complete sense. So the first thing I have to say is the research is so limited that I'm not willing to make any strong conclusions alright. It's very, very novel line of research like two or three studies that are any good and that's not enough to be able to conclude anything and there's 1 study that says probably not, two studies that says maybe, you know to me that's who knows. Another thing is big picture, yes the pulsatility of protein intake may result in a higher net level of protein synthesis. However protein breakdown has to also be taken into account, if you don't have amino acids around. If you were saying "ok there's a refractory period for MPS & we have to make sure we have these big pulses so we can't eat too often". Not eating too often also presents these big windows when your in your refractory period that occurs in which you are hypoaminoacideamic, to use a very ridiculous term. Is that you're not getting enough amino acids and your losing muscle, your actually in a state of protein breakdown, not protein synthesis, so then the body seems to have this counter feedback mechanism that if for a couple of hours or minutes or something, you have a lot of protein breakdown, it super compensates or having a lot of protein in the building, protein synthesis afterwards. So if you're chasing

these pulses but the way you're doing it is losing little bits of muscle in between what's in the net balance of that?

Danny: Yeah

Mike: Now back to the same point but yes if we eat protein very frequently you don't have huge pulses and MPS probably because they are not necessary because you didn't lose any muscle during that time. So I think that this is kind of hopeful because it says look if you only eat four times per day of protein you can get these big boluses & these really big muscle protein synthesis spikes to make up for these dips that you allow by having these longer time between meals. On the other hand if you eat 8 meals a day, you don't have these big MPS spikes but what you do have is no muscle breakdown spikes either so that I think that on average you probably comes to be about even. Which they've tested various protein sequences so far and all but the really retarded ones really pretty much grow the same amount of muscle. What do I mean by really retarded ones? 12 meals a day; nobody is going to fucking eat twelve meals a day, it's the stupidest thing I've heard in my life. Or 1 meal a day. I've seen studies with 1 or 2 meals per day in protein; who the hell eats twice? Like if you eat twice a day just get your ass right out of fitness, nobody cares, you're not really committed to nutrition okay. My grandpa, my uncle eats twice a day because his factory starts at 8am and closes at 8pm. They are not physique guys, there's 0 bodybuilders in the history the world of eating twice a day, it's absurd. So if you eat twice a day yeah you're going to lose a lot of muscle and there are some pretty good studies to say that's not really a good idea.

If you eat twelve times a day is total overkill but within that 4 to 6 meal, 4 to 7 meal range that pulse-like nature of MPS or refractory period probably makes up for a large part if not wholly for those hypocaloric or less than optimal amino acid infusion times when muscle protein break down curves are spiked. So probably one of the good thing is these things is you can eat four times a day and it's really not a big deal as long as you get your daily protein intake or you can eat seven times a day and it's probably going to be very similar. I think that's a very good conclusion for the research, what I don't think the research brings out yet is there is some kind of advantage to only eating four times a day, going for those big spikes. I can make a similar analogy for you that I think works very well with training. If you only train a muscle group once every five days you get massive delayed on set muscle soreness because each time that muscle group is so unaccustomed to being trained right.

Danny: Mmm.

Mike: You grow a certain type of muscle because delayed onset muscle soreness is very tightly linked to hypertrophy & cell reconstruction, etc. You get sore, huge

pump, tons of growth but then towards the end of the five days your muscles aren't sore, there not pumped, there not growing anymore and you lose a bit of muscle maybe in the last one or two days then you hit it super hard again and you super compensate, you grow a ton of muscle. What's better for muscle growth: that or training muscle every two or three days? Now you don't train it as much over two or three days because that would be a different volume load over a tough amount of training. You get a little of a pump, you get a little bit sore, you grow a little bit of muscle but you never lose any because you train so frequently. What does the research say is the best way to grow muscle? Both are just pretty much equivalent.

Danny: Yeah

Mike: I think the same as truth for diet and protein pulsing if that makes any sense.

Danny: Yeah, no that was brilliant Mike, thanks so much. That clarifies a lot and I love that analogy to training as well. It makes a ton of sense, so thanks for that great detail and answer. And before we start rounding up on the final few questions, one more on the timing issue because this is one that I see just so much confusion out there so I'd love to get you to break this down for us. It's around carbohydrate timing and there's kind of potential notion of there being a best time to eat carbohydrates. Now to me there's, I look around and there's pretty much a proponent for every type of distribution or timing strategy you can imagine. It used to be that people were advising the best time to eat carbs is 1st thing in the morning because your insulin sensitivity is at its highest.

Then there's carb-back loading, you need to put all your carbs at night. Then we could have someone like, say John Borardi who says "well put just most of your carbohydrates in that peri-workout period. And then we have others saying well just split them evenly across all your meals. So there's pretty much a proponent of every type of strategy. So do any of these hold an advantage over the other or does it even matter once our daily carbohydrate intake is okay?

Mike: Yes, so for the first part of the question I can answer right away is it doesn't really matter much but it does matter somewhat.

Danny: Cool.

Mike: So we got to get over that. Whatever I say as recommendations over the next several minutes is really not a big deal and if you want to do it another way it's just not going to make a huge difference, but it will make some.

Danny: Sure.

Mike: So for those people that are detail oriented and they think it's important, there's a very likely true answer to this.

Danny: Nice.

Mike: Eating all your carbohydrates in the morning verses eating them all at night is absolutely no research to support that whatsoever. Matter of fact anyone with a reasonable knowledge of physiology would rule out that would have any effect. The only reason you're insulin sensitive in the morning and I mean the ONLY

reason you're so insulin sensitive in the morning is because you have had a fast, you don't eat at night. You can become very non-insulin sensitive in the morning if you simply wake up at 4 am and eat a cheeseburger or a pie or something and take in a lot of carbs and then we measure insulin at 8 am or sensitivity at 8 am is going to be total shit because you just had carbohydrates.

Danny: Yeah.

Mike: So carb back loading. I'm uncomfortable discussing it because it is a fad propagated by a charlatan and I'm very comfortable stating that in public, please I hope he ends up hearing the show. CBL is nonsense, no serious physiologist would have ever contemplated it. There is no evidence for diurnal variation in insulin sensitivity in any sense and if there is any evidence is that the morning is better because you've fasted. So eating all your carbs at night is just a fun way to get powerlifters to cheat on their diets and still lose a little bit of fat if they control the calories. Say you like carbs at night, I'm fine, there's no distinctive advantage there. There is a lot of research that says peri- workout carbohydrate supplementation or intake is probably marginally better than all the other timings. You should spread all your carbs evenly throughout the day but there should be some pulsatility in the following way:

It has been very clear that eating carbohydrates before training optimizes training performance. I think almost everyone pretty much knows that. You know if you have a low carb meal before you go train, training kind of goes not so well, if you have a higher carb meal or moderate carbs or whole grain bagel or something you're going to have much better training. There is some evidence with very long training about starving carbohydrates supplemented in the training but for most people that doesn't apply because these have to be over an hour of strenuous exercise. So there is some very good data to suggest insulin sensitivity and metabolic mechanisms are more primed for carbohydrates after training and if you want to replenish glycogen fully that's the best time to do it. So most of your carbs should be consumed before, maybe some during and definitely after training in a tapering off manner over about six hours after training is concerned. So most of your carbs right after training, some more a

couple hours later, a little bit later and then low carb for the rest of that time but one of the reasons why it's important is that muscle damage to lay down some muscle soreness actually interferes with insulin sensitivity and glycogen synthesis. So then if you say oh I'm just eating all my carbs normally throughout the day and I'll just eat carbs tomorrow, I'll just eat carbs over the next several days to replenish my quads for the next squads workout. If your quads are sore during that time, it very actually very sub optimally replenished them and if your carbohydrates don't get into your quads their going to go where? They going to try and go into other muscles or they are going to fat stores.

So because of that limitation that delayed onset muscle soreness, places on sensitivity and then the muscle soreness actually starts to kick in about six hours later. So it's been shown very reliably that multiple hours after you train the insulin sensitivity starts to go down pretty dramatically if you've damaged that muscle and by if you've damaged a muscle that means if you've trained it remotely hard to get accomplish anything right? So muscle damage isn't going to be a very frequent thing. So if you're damaging muscle you had better consume lots of carbohydrates before that has a tendency to kick in and coincidentally muscle sensitivity to insulin and to all take carbohydrates even without insulin via GLUT 4 mediation is upright regulated after training. So after training is a very good time to eat carbs from a multitude of consistent factors which is great. So you can definitely spread your carbs normally throughout the day at any given day but on a training day should probably have some more carbs pre-training and plenty of carbs after training. If you make it anymore "scientifical" if you make it any more complicated than that you're probably making shit up.

Danny: Yeah (chuckkle)

Mike: And certainly carb back loading falls into that gigantic problem. I use to think that carb back loading was pretty cool then I saw an interview or rather a YouTube comment by DH Kiefer the guy who made it up and somebody asked him what if I train in the morning do I carb back load? He says yeah you just low carb before training, low carb during training and after training and then around 5 pm you can start to have carbs and I was like wow that just totally violates nutrient timing around workout, that's just complete bogus so he's basically saying that there is some kind of magical element of eating carbs at night and there is just totally no evidence for that and nobody would ever think that was the case just looking at basic physiology.

Danny: Nice I love that breakdown and that I'm sure cleared up a ton of stuff for people and I lied when I said it was going to be my last question because that just reminded me of something...

Mike: No worries, keep going...

Danny: Yeah just one of the topic post workout nutrition. A nice little maybe segueway into bringing fat timing into the equation here because a real kind of common issue for people is they know that protein is something they probably should be having post work out. Carbohydrate is one that depending on someone's goal and when there next training session is something a lot of people are probably going to add there as well but there is a lot people concerned about, well if I add fat in especially post work out if I'm taking in carbohydrates is that going to be an issue. So it's generally around the gestures slowing effects I suppose of dietary fat if they are taking that post work out window. Do you have any thoughts on someone that would say be going for a mixed meal or is it better if they do try and keep fat intake low, post workout?

Mike: Yeah from a theoretical perspective a lower fat intake PWO is definitely recommended. So after you conclude your workout you want the carbohydrates and protein to be in your GI tract probably as fast as possible, certainly for the anti-catabolic effects of the carbohydrates and protein. You want them to be on the spot because workouts are very catabolic and you probably don't want that to happen for longer than necessary. Again, another problem with carb back loading is the foods that are recommended were like danishes and pastries and shit with hundreds of grams of fat in it and what ends up happening is only 3 or 4 hours later are any of these carbohydrates start to seep in at any meaningful qualities as they were so massively delayed by the fat intake. So yeah, absolutely before workout a lot of fat is not a good idea because it stresses the GI tract and basically if you have enough fat before work out and your training hard you're going to throw it all up. Right, blood is shunted away away from the GI tract towards working muscles when you're training and GI tract makes an executive decision on some point if it has food in it and it's not being digested, it's just going to throw it up for you. It doesn't want food just sitting there. So you want a lower fat intake pre-training, inter training a terrible idea to have fats of any kind, post training stick with low fat and as you exit the training window over a couple of hours and the meals that come along with that you slowly raise your fat intake back to normal level. So yeah I would absolutely be in favor from a theoretical perspective and unlimited research perspective on lower fat intakes right after training and then slowly raising them back up and actually that has been paired with glycemic index, probably a good idea to have more of a high glycemic foods that get rid of the blood quickly and a little bit of insulin but right after training then lower the glycemic index of the foods as you leave the training window.

Danny: Yup, perfect and just to clear up for people, say outside of that post work out period, just a normal mixed meal throughout the day they shouldn't be concerned about this kind of notion of you shouldn't combine fat and carbohydrates in the same meal, it should either just be protein or fat, like there

is no kind of magical thing that is causing someone to put on body fat if they do that right.

Mike: Right, well you know it's funny with people use to have a notion people have and I guess some people do. So the problem so it was envisioned was that if you eat carbohydrates that spikes insulin and if you eat fat that provides insulin something to make into body fat, so that something with carbs and fats in it was supposed to be the ultimate fat building machine because it had carbs spike insulin and then pack fat into cells, the problem's that fats directly counteract the effects of insulin by lowering the glycemic index that their paired with, so if you have carbohydrates that is normally moderately glycemic and a large fat source and protein source with that especially if you have some fiber in there because what happen is that source of carbohydrates turns into very low glycemic source and its insulin in effect is very small and the fat metabolism really isn't a very big deal.

Now there maybe some counteractive arguments to that very extreme cases for example if you drink Gatorade with every meal and you have cheeseburgers for every meal that might be an element to where you lower your carbohydrates as your essentially sending gigantic lobs of fat along with a chemical messengers to make them into adipose tissue but with a normal range of foods selections, yes you can eat carbs and fats at the same time because the glycemic thing is not an issue because fats automatically lower the glycemc of foods, it's not like fat appears in the blood really quickly and there's tons of insulin and the insulin just dissolves the fat right in the fat stores, fat slowly enters as usual and the insulin is going to be very low response because of the fats depressive effect on insulin secretion.

Danny: That's brilliant Mike, you've absolutely done an amazing job on the nutrient timing stuff we've got into and it's something I'd like to dive into a little bit deeper but for the sake of time we'll start kind of wrapping up with things. So coming towards in the show going to do a really quick fire round almost just kind of three little short questions. If you can try and shoot back a one line answer if that's possible or take it as long as you want but just for the sake of your own time very kind of general questions but something maybe will come out of. The first one is if you could change one thing about the fitness industry like what would it be?

Mike: My education for the consumer in regards to proper scientific principles. The consumer is in charge, demand is king in capitalism and it doesn't matter how intelligent the producers are if the consumer is consistently want bull shit they will have it, somebody will supply it for them. So I don't have a problem with fitness industry at all I have a problem with the consumer. If the consumer starts buying science, science will begin being sold.

Danny: Love it. Next one, biggest difference between a good coach and a poor coach?

Mike: Depends on what kind of coach you're talking about. If you're talking about in person coach as in experience is a really big deal and you know I'll say this the degree of optimal open mindedness and I'll define that really quickly. So there are people who just I do this the way I've done it and there won't be any science, there won't be any literature, they won't talk to other coaches and they'll do shit wrong.

Some of them do right and some do wrong but they just won't update themselves and that's bad. Then there is too open minded where your brain falls out your basically some kind of hippy coaching like "yeah man we're trying this new thing from California today these new resistance bands super crazy training" and like oh wow I've heard about it, it's all the new rage and you're so open minded that you can't really do anything between things that work and things that don't. So some of the best coaches are somewhere between that where they are open minded to things that look they have potential promise but are close minded enough or conventional to keep what works and stick to the basics.

Danny: Awesome and finally the number one reason why you think people fail to realize a health or performance skill.

Mike: Yeah, I hate to sounds like a rear motivational type but with perseverance, just statistically it's the number one reason. People fail for all sorts of reason some people fail their lack of information, they fail from bad coaching, they fail from circumstances but most of the time people just don't really want to get in shape that bad and make the trade offs and it's okay, actually one of those guys in the industry I'm not just all about being fit, I think being fits great but a lot of other things are great too.

Spending time with your friends, eating delicious foods and laughing and smoking cigars and drinking whiskey is a really good way to spend life and I can't really tell someone who dies at age 70 that they should have had 5 more years of fucking cut in every god damn car they have and that they really should have you know they really lived an awesome life and more power to you/ I don't judge people for not being fit but at the same time if you're going to be fit your going to have to make some tradeoffs, people are just not willing to make the trade offs, which isn't a bad thing, they are just no willing to make the tradeoffs so they probably know most of the time, we can probably year round fit people enough to know that the people who don't get their fitness roles say ah I just don't feel like dieting. Hey that's totally cool, just got to admit when it's your fault and not society or some other thing.

Danny: Yeah, cool, cool. So before I get to the final question I round the show up with, now might be a good time if you could let people know where they can find you online Mike and what kind of stuff that you've got going on and at least check out.

Mike: Cool, yeah so check me out on Facebook at my name Mike Israetel and you can friend me and look at half naked pictures of me at body building shows and things of that nature. Then I know I'll do some rants on Facebook every now and again and people think those are pretty cool. And then I am a contributor, a programmer and the head science guy at Renaissance Periodization and that's renaissanceperiodization.com you get bonus points for figuring out how to spell that, I sure as hell don't know and so that's cool and we have a blog we just started there.

Renaissance is really unique to the industry. We employ almost exclusively PhD's in exercise so all of our coaches are professors basically which is kind of a trip. So you get to see really cool stuff at RP. And I write for Juggurnaught Training Systems and that's our book the RP, the Renaissance Diet sold through Juggurnaught so if you and renaissance diet it will come up with a link to buy a book, Google some Juggurnaught articles, they got some pieces I'm really proud of. Really big posts, a lot of scientific pieces I've written about fatigue, I've written about the training process, written about dieting, it's medical stuff for people who are really into thinking about getting more strong, stronger, leaner, more jacked, all that good stuff. So that's basically it I think, just about where I can be found, you can find me on YouTube just by typing my last name and I lift weights and some of that kind of impressive so that's on YouTube.

Danny: Yeah, for sure and for everyone listening I will link up to all that stuff in the show notes so you won't even have to try and go spell renaissance. So I'll have that linked up for you guys.

Mike: Thank God!

Danny: So to click through and I'll have the book there and links to some of Mike's articles, ones that I found there particularly helpful as again kind of my recommended reading list so you guys can check that out on the show notes page. So that brings us to the end of the show and with the final question that I leave everyone with Mike. It's quite a bit broad one, so just whatever comes to mind first and it's simply if you could advise people to do just one thing each and every day that will improve their life in some aspect. It doesn't have to be related to nutrition or fitness at all. Any one thing that people should do each day that make their life better what would that thing be?

Mike: Geez you know I'm no life coach, my own personal life is a sad series of divorces and litigation, I've been to jail, I'm actually in jail right now. I'm in jail broadcasting this show, just kidding! So I think that a very good addition to any pursuit of knowledge is looking in the right place and I would say a very good place to look, very boringly, is in textbooks. Some people are quite impressed of my breath of knowledge & say "oh my God how did you learn this much stuff?" I've read text books for fun, that's the answer. You read enough text books, you know a lot of shit. So they're boring, there dry but that's the reality of knowledge. I mean we just had a talk about fractional synthetic rates and MPS and how the hell did I learn that, well I read textbooks. If you read PubMed articles or you just read articles people write on the internet, if you read my articles you're going to have a very incomplete understanding. Now if you've read textbooks and on top of that you read all this other stuff you're going to have a great understanding but try to...if you're interested in sports nutrition, Sport Nutrition by Jeukendrup &

Gleeson any edition, 2010 is just fine. It's a great book, it's a textbook but it's going to give you a basic understanding and you know you don't go to medical...you don't try to do surgery without reading medical textbooks and go to medical school.

I understand you'd rather try diet, nutrition and training if you haven't read text books on the matter. And the thing about this a lot of people don't have a basic fundamental understanding of the science they are leading to. They'll program hop and say what do you think of this diet, what do you think of this training method. I don't think a whole lot about them because I know the basics. Where they get the basics? Textbook and if you look at good text books in the field, if you read them you're going to sloth through them, it's going to be a pain in the ass but after you've read them you're going to know a lot of stuff and a lot of the previously controversial and mysterious aspects of our field just going to go right out the window. The mystery disappears and you're like oh shit how did I ever fall for this stuff, well you didn't read the basic literature that's it.

Danny: Love it, love it so much. So there you have it people stop watching crap on tele at night and open a text book and you'll soon be able to understand how to do your training and nutrition.

Mike: World's most boring advice. Thank you I'll take credit for that.

Danny: Well crack out a cigar and a whiskey while you're doing that and then it's all good, it balances out then.

Mike: It's all a party.

Danny: Mike it's been an absolute pleasure to have you on. I hope to have you back in the future because we didn't get to dive into too much training stuff which we could have talked about for hours as well. So it's been an absolute pleasure to have you on, thank you so much for your time and your information and for the great work your doing I just want to say thank you so much.

Mike: Thank you Danny and I'd be more than happy to come on the show at a later date.

Danny: Awesome. I will talk to you soon my friend.

Mike: Alright, take care.

Danny: There you have it I hope you took an amazing amount of information away from today's show. Dr. Mike Israetel delivered the goods, some pretty amazing info in there and I'm delighted that he came on the show to deliver that message to you guys. Remember all the stuff that we mentioned in today's show so those various posts, the research papers for example the one that's Stu Phillips' lab did, the renaissance diet book, some of Mike's articles over at Juggernaught Training Systems as well as renaissance periodization.

All that stuff as well as how you can contact Mike is all linked up in the show notes to this episode over on sigmanutrition.com/episode43 so if you go there you'll see a breakdown of today's show, the main points to take away from it and links to all the resources we mentioned as well as ways that you can stay in touch with both Mike and myself. So please do go and check that stuff out. Wherever you are listening, whatever app you listening on please make sure to subsribe to the show, so whether that's iTunes, for you IOS users or maybe you're on Stitcher Radio if you're android, please subscribe to the show and I'd love if you gave a review as well. It takes one minute but it makes such a massive difference to how the show does and also makes me feel pretty good when I see one of those come through when someone has said something nice about the show so please consider doing that.

Over the next few weeks like I mentioned last week, we've got some really cool shows or I think these are going to be some of my favorites to do. They are definitely on topics that I'm particularly interested in at the moment. So next week we're going to be talking with Mike Samuels of Healthy Living, Heavy Lifting who is a really, really cool guy. He's I suppose going on a very similar journey like myself and one that I mentioned in some of my blog posts recently so we'll dig into some of that and he's also got some pretty cool perspectives on things and then the following week we'll be talking with Dr. Bill Willis who is a researcher and in exercise physiology who's going to be talking about the role of antioxidants in sporting performance and how actually there are few surprising

things that we can learn about that and I think that would be a pretty cool chat as well. So with that in mind I think that is pretty much all we have for this week, please make sure your on the Sigma Nutrition mailing list, so head on over to the website and check that stuff out. There's going to be tons of free stuff on the website and over the next few days, so please check back there periodically to make sure you capture that and like I said if you do want to leave a review that would be awesome or even if you go on Facebook and shoot a message either to myself or actually shoot one over to Mike and just say heard you on Sigma Nutrition radio, thought it was a great and that stuff is really is win-win, glad to hear it so thank you so much for listening. I know this is a big chunk of anyone's day to spend listening to a show so please do realize it really is appreciated that each and every person that listens to this show, I really do honestly appreciate that so much and I'm going to stop talking and let you get on with your day and until next week have an amazing week and I'll talk to you then.