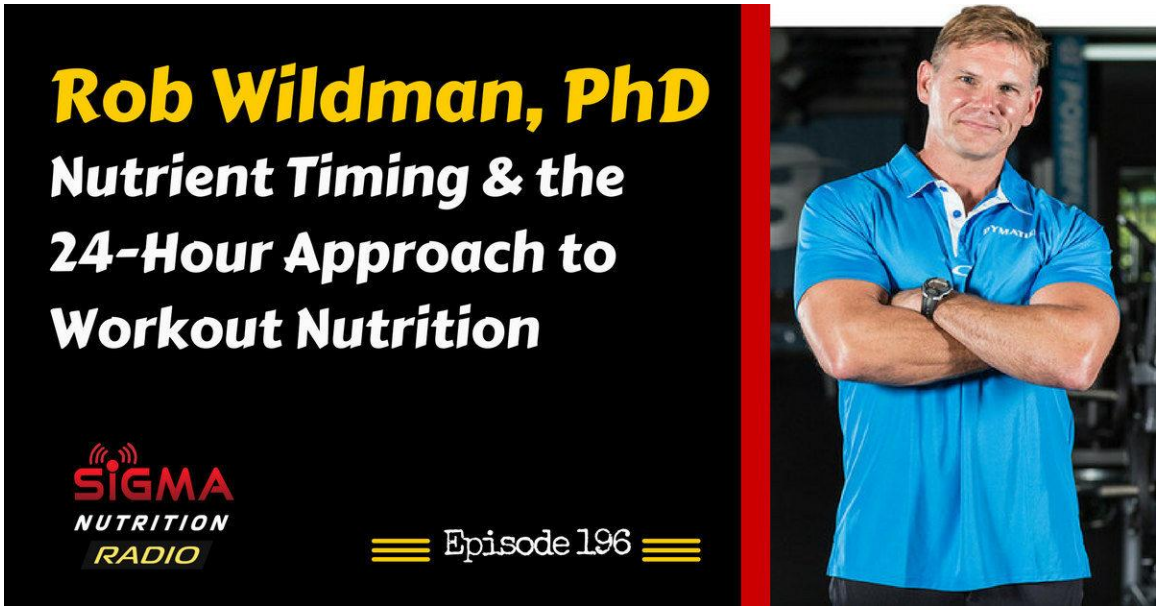

DANNY LENNON: Dr. Wildman thank you so much for joining me on the podcast today. How are you doing?

ROBERT WILDMAN: I am doing great. Thanks so much for having me on. I love your program.

DANNY LENNON: Yeah, that's great to hear and really does mean a lot, so thank you for those kind words. And I am really for this conversation. There's a lot of ground I think we can cover. And things that are probably particularly important for people in the field of sports nutrition or does looking to eat and supplement better for their own goals in the gym and I think you can do an excellent job in covering a lot of that. But what I am particularly interested in starting this conversation with is hearing a bit more about the work that you are currently doing, typically what day to day running of things looks like for you and maybe tell people a bit about what you are involved in right now.

ROBERT WILDMAN: Well, I have sort of a unique position and it definitely is a fun one. My background is in nutrition. I have a PhD in nutrition from the Ohio State University, plus I am a registered dietician and licensed dietician. So I've been working with people for decades in how to optimize their diet, not only for sport performance and fitness but also to just help them achieve whatever their personal goals maybe. At Dymatize, I have the luxury of serving as Chief Science Officer for

Dymatize Nutrition, PowerBar and also Premier Protein. So those three brands make up a very significant portion of the protein market in the United States, in different sales channels.

On the Dymatize side particularly, and then to some degree on the PowerBar side, the protein and other nutrient applications are specific to athletic performance, whether that is performance on the field, in the water, on the ice, wherever it maybe. And then also performance in the gym and it's not just powering and fueling better workouts, but it's also how to nourish muscle as it goes through its extended adaptation period over the next 12 to 24 hours.

DANNY LENNON: Yeah, and I think that's actually probably a nice segue into some of the topics we are kind of discussing off air and one that I know you are particularly passionate in talking about is probably trying to get people to reframe how they think about recovering and adapting from typical training sessions through their nutrition. So maybe to lead us off, can you maybe talk about the conventional way a lot of athletes maybe think about post-training fueling or just the recovery and adapting process in general, and how maybe a more comprehensive look is what you might recommend what that might look like?

ROBERT WILDMAN: Yeah, and I think the best way to think about it or to start the conversation is to step into Mr. Peabody's WayBack machine or somehow go back in time. And if you go back a few decades, the majority of sport nutrition was really fueling and hydration. You had sport drinks and a very large sport drink market developed in the late 60s, early 70s and so forth. We were really focused on how to nourish a workout whatever that maybe for soccer, for cycling or whatever, and we were really zeroing in on carbohydrate and fluid and to a lesser degree electrolytes and so forth. And so it got us in this mindset that we had to be laser focused, hyper focused on nourishing the workout itself. And that certainly is very, very important, but what we've been doing over the last few years and doing it in certainly in collaboration with numerous universities and doing our own research at Dymatize, in our facility at Texas Women's University is we've been looking more at a

24-hour day, and framing up the idea that it is absolutely critical that you have your best workout. So if that is to include some nutrients and being hydrated before you start your workout, nutrients during your workout and then also during that early recovery period but getting that best workout, because great results improve performance, is the result of better workout sessions wherever that occurs. But also the right nutrition support, during that performance, but also in the hours that follow. And we sort of forgot about the six hours and the eight hours after a training session or field work, practice, whatever. And we really left behind night time nutrition as well and it really hasn't been until the last few years that we become a little bit more engaged and within the last couple of years to be a lot more engaged into what happens during sleep and whether or not we were overlooking or undervaluing this really important time during a 24-hour period.

We may sleep for six to eight hours and we kind of let that go, and here in the United States and probably elsewhere, there were a lot of dieting programs and gurus that would say, oh don't eat after seven o'clock at night and so forth. And the idea was, hey, if you eat before bed, that will disrupt that breakdown in fat burning. And so a lot of people really kind of say, okay, I am not going to eat later into the evening or not eat strategically whether that's protein or other nutrients later in the evening because I fear that I won't have control over what happens while I sleep.

But great research out of Luc van Loon's and also Mike Ormsbee's lab at Florida State University have helped us really understand that while we sleep, muscle can continue to adapt and change to become stronger and bigger and move towards the performance, that the exercise is stimulating the drive to move in that direction. But also what Dr. Ormsbee's lab is showing is that protein and probably a lesser amount of carbohydrate won't really impact the body's ability to break down fat from fat stores into oxidized fat to burn fat while you sleep. So it's kind of the best of both worlds why you sleep in that you get the positive impact on the muscle and the muscle protein turnover if you have protein before bed, and it doesn't disrupt your body's own ability to continue to burn fat while you sleep which is where a lot of us count on burning

a lot of fat and doing so, while we sleep because you are just – you don't really have to do anything.

So we pull back and we look at the entire 24-hour period and say, okay, is the entire 24-hour period important. And the answer is absolutely, it will play a role, every hour of every day could be important and could be significant. And I always like to frame up changes in body composition whether it's changes in a direction of gaining muscle, muscle size, muscle strength or losing fat – I mean these are changes in weight and weight that we measure in grams. And big changes over time whether it's in kilogram amounts or pounds over here in the United States, if it's in kilogram amounts big changes in kilogram amounts over time are the result in changes in gram amounts on a daily basis. So we consider that gram warfare and you have to consider every moment and every day as important, all those small battles ultimately will help you win the war.

DANNY LENNON: Yeah, lots of great points that I want to dig into there and I am glad you brought up the example of maybe nutrient timing towards night time and thinking about that sleeping period and in fact you mentioned Luc van Loon's group at Maastricht University. We had Jorn Trommelen who has conducted some of that work on casein pre-sleep on the show to discuss that. So I think that kind of dovetails nicely into this conversation. Two of the things that you mentioned I think are really important around this 24-hour nutrition approach. one is that getting people away from the mindset particularly of only focusing on that post workout meal and I think for maybe a lot of people listening, particularly people within the evidence based nutrition area so to speak, can kind of resonate with that, right – that sure you cannot do a workout and maybe get some protein straight afterwards, but if you are overall caloric and macronutrient and meals across the day aren't in place and you are probably undermining yourself. But I think on the flip side of that and I would be interested to hear your thoughts on this Robert is when it comes down to the concept of there are best strategies in terms of where we time those meals and nutrients over the course of 24 hours to maximize these adaptations. On one end we've, in the past, seen people go way too far and say, as soon as someone finishes like the very last rep of their workout, they need to be smashing back X amount of grams of

protein and carbohydrates immediately or they will lose all their gains. But then it seems to have come full circle to a point where some people now are almost trying to indicate that nutrient timing has no impact whatsoever which is probably just as false an idea. Have you seen that kind of pendulum swing from both these extremes in terms of just the concept of nutrient timing in general?

ROBERT WILDMAN: Yeah, I think so. And I think as – there are scenarios where nutrient timing becomes a lot more important and it's not just protein. I mean, it could be carbohydrate, it could be fluid ingestion for hydration and performance. So I think sometimes we get a little too hyper focused on protein. But I think if you go back, if anybody goes back and looks at some of the nice review work that's been done out of Stuart Phillips' lab and so forth, they always show those really nice curves, those amino acid curves post meal hyper aminoacidemia that you get after you ingest the meal. And they go up and they come down, they go up and they come down, depending on how frequently you eat a meal and how much protein is in each of those meals.

So that really emphasizes the idea that there are timing components that are important. However, for individuals that eat a lot of protein, or even a lot of carbohydrate or whatever it is, some of that timing gets sort of washed out and it just gets folded into a greater scenario which is totals over timing. And I think that's what we see when we look at some of the nice meta-analysis data that's been done by Schoenfeld and Aragon and so forth, and they show us that as you get more and more protein in your diet and you get up over 1.7 grams per kilo and into 2 and so forth, timing sort of becomes a little less important. And the reason is that those amino acid curves with the meals – because your meals get larger, you get more protein at those meals that they begin to overlap more, and it sort of washes out the specifics of a timing effect.

If people are in a more restricted dietary scenarios – and I think this is where one of the places where timing can get a little bit more important is during either macronutrient or total energy restrictions, sport

related restrictions either because an athlete is trying to make weight or preparing – so you may have some very customized protocols where timing may become a little bit more important. So it's always that you look at totals and if totals don't take care of the timing, then you can look at the timing a little bit more specifically.

Now, I do think that there is – if you were to say, okay, what's a priority of timing, the priority of timing would have to be around the workout period, for really two reasons. Number one, if you are planning to take in certain nutrients before you train or before you go out onto the field, because you have a better training session or you have a better practice session, that's going to lead to better results. And I think all the training data that we have now, clearly indicates that better results come from better training, better training volume and so forth. So the timing of nutrients before and potentially during can make the difference in getting better workouts. And then on the protein side and on the recovery side, we see this with carbohydrate as well, that there's a period of potentiation that occurs within the first couple of hours, and a little bit closer to that workout, the completion of that workout where whether it's muscle protein synthesis or it's glycogen recovery, it's more aggressive than it would be six to eight hours later. So it just wanes over time.

So you could say that from a timing perspective, it's important to get that period of time right. And if you are looking at your total day and if you eat before you go to the gym and it's a high protein diet and you are in the gym for two hours, going back to your point, is it absolutely critical that you are in panic mode immediately after you are training to get protein into your – you get the amino acids into your bloodstream? Probably not the case. However, for individuals that maybe are training first thing in the morning and they are going to the gym and maybe they had a light breakfast or coffee or something along those lines, then I think timing becomes a little bit more important. And you have to, like a lot of times we look at academic studies and a lot of times in these studies they bring the guys in, guys or girls, they bring them in, in the morning at six, seven o'clock in the

morning and they come in, in a fated state. And then you see these really fantastic increases in muscle protein synthesis and so forth after the training session when they are given protein either immediately before or after.

So in those types of scenarios when you enter your training session in an undernourished state, the importance of the timing after becomes a little bit greater. And again, I think a lot of academics out there would say, well, it will sort of wash out a little bit over time if you get a lot more protein throb, and that maybe true. But if you are going to look at this and say, I am going to take a very comprehensive approach to just sort of try to optimize every moment, why wouldn't you make sure that that post workout that you are in the best nourished position to optimize and to increase muscle protein manufacturing because that is the time when it's going to be the greatest for the first couple of hours afterwards and slowly wane over time.

So again, what did you have leading up to that training session? And if you came out of lunch and at lunch you had a high-protein meal and then an hour later, you go to the gym, again, you are not in 100% panic mode, but you would want to have your next high-protein meal within the three-to-four-hour period after the last one. But if you enter that training session in an undernourished state, especially from a protein standpoint, yeah, I would have to argue that over time – and I don't know if we've looked at this well enough yet to really understand it, but over time you maybe at a slight disadvantage. And going back to the idea of gram warfare, it could lead to subtle differences over time.

DANNY LENNON: Yeah, I am really glad you mentioned some of those examples to really provide context of different scenarios and how that will affect this question around nutrient timing. And to me what it really speaks to is not a matter of people asking this question of does nutrient timing matter or not, because it's probably the wrong question, it's more of nutrient timing will always matter. But it's just more in a spectrum of how much based on these different scenarios – for example some of the ones you outlined

there, if we have an athlete in a hypocaloric condition, and they only have a certain amount of calories to play around with, and they have a priority training session that they then – sure what they eat leading up to that session is extremely important versus a different context where maybe it doesn't matter – someone on a rest day that's in a calorie maintenance or surplus condition and maybe doesn't have a main performance session going on that day for example, and there's probably endless amounts of scenarios we could come up with.

But I am really glad you placed that context on it and trying to get people to think of this idea that it is along spectrum. With that said, I think there's – when people are trying to conceive of this kind of difference between the literature maybe and what we've seen to be true – because I think the importance of that washout effect you mentioned is really important and is actually one of a number of different things that can influence maybe some discrepancy between what we can know for sure from a research standpoint to what is maybe used in high-end sport. How do you advise others, say performance nutritionists and dieticians to maybe reconcile those slight differences that we may have right now based on there still being more research to be probably done to dot the i's and cross the t's so to speak?

ROBERT WILDMAN: I think that and a lot of really good sport nutritionists make this point. If there's reason to believe that it could possibly help, why wouldn't you advise for it and if there's reason to believe that you can do little to no harm, again, why wouldn't you advise to do it, to make sure that you are in a well-nourished state over a 24-hour period, that you are looking at that post workout 30 to 60 minutes and thinking about, hey why don't I make sure that I do have a good dose of protein during that time or carbohydrate if you are trying to recover glycogen stores. And I think sometimes we lose – we get a little too focused on gym scenarios because that's the greater percentage of people who train through their adult years, but there are a lot of scenarios, multisport athletes, triathletes and we see this a lot on the PowerBar side, where they may be looking at multiple training sessions during the same day, and timing becomes a little bit more

important to recover glycogen stores as quickly as possible before they go again.

Multi-training of the same sport within the same day is another scenario or long endurance training that happens – or competition that happens in a serial nature, maybe five long rides in the course of one week like you may see in a tour athlete, for them timing really begins while they are on the bike. And that they are already, they are trying to provide the carbohydrate that will drive the end of their performance and the fluid that will help them maintain a hydration level that will keep them as light as possible but yeah, keep them in a high performance hydration status. But also as soon as they finish, because they were on the bike for let's say four hours during the course of the day, and the next ride is coming up at 20 hours from now, plus there's going to be a period of sleep in there, timing and aggressive consumption becomes very, very important.

DANNY LENNON: For sure. And as a practitioner who works predominantly with mixed martial artists, I can certainly attest to what you are saying there. The real importance of timing for athletes who are doing not only high-end training but multiple sessions per day, particularly with the glycolytic nature of a lot of these training sessions, and it just drives me nuts when people try and dismiss that. Once people are hitting total daily intakes then they are fine. I mean, that's a very sweeping statement and doesn't really cover athletes in I think most sports, probably I think maybe to go into this a bit deeper, maybe if we consider some of the macronutrients separately, to start looking at some of the issues related to timing of that. And one thing I wanted to pull back on, in relation to protein was earlier on you had touched on this concept of looking at per meal timing versus daily total intakes for these things. And I think protein is a good example that we can talk about and I think listeners who have been regularly listening to this show have heard us talk about protein dosing and distribution to maximize muscle protein synthesis at least theoretically and we are kind of seeing literature probably saying something in the range of three to four evenly spread doses of somewhere around like 0.25, 0.3, maybe even a bit higher grams of protein for

every kilogram of body weight in those kind of meals across the day to maximize the MPS response. But where some of the kind of confusion and some questions come up is people will hear that and then also hear recommendations for maybe total protein intake on a per day basis to be somewhere between the 1.7, maybe as far as 2 grams per kilo per day. And now people will start doing some math on this and say, well, there's actually maybe a bit of a discrepancy in what those numbers play out of that total daily intake you are recommending versus these three meals of this intake you are recommending. So can you maybe explain a bit why there seems to be those discrepancies when they are comparing these total intakes versus per meal recommendations if they were to do some math on that, if that question makes sense?

ROBERT WILDMAN: Yeah, and I think there's a whole bunch of ways to look at that, but you are absolutely right, it's what I like to refer to as mathematics of muscle. And when you look at daily totals and you look at 8 to 12-week resistance training type studies and you look at gains and protein intake and where are sort of the thresholds where the participants get better results over time. And again, I think some of the work by s Schoenfeld and Aragon and so forth, when they did that and they all elected at and pulled those types of training studies, they are finding 1.7, 0.7 grams per kilo as sort of a minimum, as sort of a threshold.

And you are absolutely right, then if you go back and you look at more of a research scenario and you get to these 1.25s and 1.3 grams per kilo, and based on work by like Witter and they are suggestive that if you train a single muscle group and you compare it to a rested other side of the body kind of thing – so if you do like leg extension and you do multiple sets of resistance exercise in leg extension and then you rest the other leg and you pull muscle samples from both of those, and then you give – that's after giving a post workout protein dose of let's say 10, 20 and 40 grams of protein, what the research – it was suggesting was that somewhere around 20 grams muscle protein synthesis markers were significantly different than 10 grams or no grams of protein and when you go up to 40 grams, they weren't statistically different than 20

grams. So they are like, oh, okay, well, somewhere around 20 is probably a minimum and then 25 is good and so forth. So you get into those numbers of 0.25 and 0.30.

I would look at that and some important things to remember, number one, those are averages or statistically means and then the other thing is we have to look at that information as a minimum, as a threshold. And it's almost like the RDA which we have, and a lot of times individual will say, well I am meeting my RDA. And I will say, well that's great, so you are ensuring you are not going into deficiency. We have to clearly understand that sometimes these recommendations are sort of the ante if you are playing poker. It just gets you into the game. But whether or not it's the optimal level, that's somewhere above it. And then when you look at the experimental design in which we are basing some of these recommendations, in Kevin Tipton's lab a researcher – one of his researchers Macnaughton did a really nice study where instead of doing like a single muscle exercise scenario, they did multi-muscle groups and did more of a comprehensive training, and then they went back and they reevaluated the 20/40 scenario. In that scenario, where more muscle is being trained during a training session, when the guys got 40 grams they had elevated muscle protein synthesis measures over the 10 grams.

So it really helps frame up the idea that when you make recommendations you have to take into consideration a couple of different factors, and this is really a recommendation proposed workout, because they are not looking at the other meals as well. But in that post-workout protein coming out of a fasted state, if you are working a lot of muscle, you probably need more, you absolutely need more, and now the ante or the minimum has shifted to well above 20 grams to closer to 40 grams when you do more. And the reason for that is more muscle has to be served with the protein load. There's enhanced circulation going to more muscle tissue and more amino acids have to be utilized in order to build more protein in all the tissue that's been trained.

And it just comes down to sort of mathematics or algebra or a theoretic construction site and you are building one building or you are building five buildings. If you are building five buildings, you have to deliver more material to build the five buildings than you would, if you are only building one. So I think that kind of research, Macnaughton study is really, really helpful in kind of customizing recommendations. But it does really help us understand that there is a rock bottom minimum and that rock bottom minimum is there somewhere around 0.25 to 0.3, 25 grams and so forth. But where it gets optimized probably is much higher than that. And then you begin to tie in a little bit better with some of those bigger daily total recommendations, because when you go up to the 40, the 50, in that post-training scenario, and then you have other meals that are say 30 or 40, now all of a sudden you are up into that 1.7 grams per kilo range and things begin to align a lot better.

DANNY LENNON: Excellent point. And while we mentioned some of those typical findings that people will point to of maximizing MPS with around that 20 to 30 grams as an example, one of the things that tends to maybe come out of that and certain people come to conclude and I am sure this is a pet peeve of yours as well as many other researchers, is people start looking at this and saying, well, there's no point in ever going above that number because 30 grams will maximize that response and then they start talking about the rest being wasted. You can't use it and the claims go even beyond that and people talking about it's not going to even be absorbed, it's going to get wasted, all these type of thing. How would you respond to these claims and ideas that people talk about with this idea of wasted protein when the per meal dose is too high, so to speak.

ROBERT WILDMAN: Yeah, well, I think there's an assumption there that's important to draw out. When somebody says something is wasted, I always have to ask the question, and that is, well, where is optimum. And I don't even know if we have a good firm handle on what optimum is and the timing of it and so forth. When you go to the 30 grams or 40 grams how do you know that that you are exceeding an optimal amount

for you based on your workouts, your training, the position of that in your total day, scheme? And that's one thing, because in order to say something as being wasted, you also have to say that I am confident that I know how much is enough. And I don't think we know that and I think that's all unfolding on a daily to weekly to yearly basis as new research comes out, and we understand all these scenarios a little bit better.

The other thing is that I think sometimes we get too focused on muscle. And when you look at total body protein, where is it? You may have two-thirds of it in skeletal muscle but there is protein throughout the rest of the body. And I don't think we really fully understand the prioritization of dietary protein in training scenarios. So there are other places in the body that require protein, the lining of the digestive tract for higher protein intake. So you are probably producing more proteases that help digest and absorb that higher protein intake, you have other places in the body where protein is critical. If your weight training, you are changing the composition of bone, 35 to 40% of bone is protein, so bone has to get stronger too. There's all these other places where dietary protein can be utilized and I don't think we have a firm handle on that to really understand that it's truly being wasted. There are other things that I think are really cool to think about as well, because protein is the most thermogenic of the nutrients.

So if you are taking in more protein and its substituting for other macronutrients, it may be a good strategic substitution. The excess of protein calories that we may consider waste maybe more thermogenic and help us with body weight management better than excessive amounts of carbohydrates or excessive amounts of dietary fat. Also from maybe a hunger standpoint or satiety standpoint, I always like to point the protein out as your training buddy, as your true partner, in that from a macronutrient standpoint, when it comes to making changes in how your body looks, how it performs, protein is the most important macronutrient. And not only will it support changes in the skeletal muscle and other changes within body structure and function, but also it's going to help you with the management of

your total caloric intake and probably with hunger as well.

When I counsel people, I don't really even counsel people on calories. I mean, we get a good general idea, and we should for general targets, but when I have them build meals we start with protein. The first step in building meals throughout the day is number one, what is your protein source, and then number two, we build the flanking components and the flanking components are health driving foods such as fruits and vegetables and whole grain products. And then the remaining part of your dietary intake is really what I would consider the fuel nutrients, the extra carbohydrate and the extra fat, which is primarily going to be customized up or down based on how many calories you are burning incrementally with physical activity, whether it's weight training, whether it's sprint, whether it's field play, whatever that is, but that's going to drive sort of that third component.

So, we've been having some pretty good success just having people structure their meals that way, allowing them to earn their fuel calories, but really build from protein out, protein and health and fuel. And it's kind of a neat way to look at it, and it makes sense for a lot of people, and sometimes getting down into the detail of counting calories and grams and this and so forth, it can get a little bit overwhelming and a lot of times it's really not that accurate to begin with.

DANNY LENNON: Yeah, and like you say, I think with some really good quality guidelines and general structure of how to build out meals across the day, within the context of someone's training, I think you can probably get pretty close or as close as you actually need to most of those targets in terms of macronutrients anyway, without having to be super precise, you get perfectly within the right ballpark. And when you mentioned that idea of us getting too focused on muscle when it comes to protein intakes I think that's especially the case when it comes down to looking at muscle protein synthesis, and it actually reminded me of something – Professor Donald Layman said to me before around, you could even have protein that doesn't go towards MPS, that ends up just getting oxidized and can still have like these downstream signaling effects that can

play a role somewhere as well. So it doesn't always have to be this narrow focus on one specific pathway and response, which I think ties into this broad concept you brought up of really looking at what's going to happen over that 24-hour period or longer.

With that Robert, I wanted to turn to maybe a couple of things before we start wrapping up. And one is kind of a more general question that I was just being interested to ask you, considering how long you've been within sports nutrition, the positions you've held, the amount of experience you have of working with high-end athletes and just the amount of published literature you've been involved with. What has been something within sports nutrition or even generally nutrition overall that you've changed your opinion over the years that kind of sticks out as a first example? What's one thing that you think has developed or changed slightly or modified over time as more and more stuff just came out or as you worked with different types of people?

ROBERT WILDMAN: Well, I would say, and it's not necessarily that my opinion has changed as much as that some of what I felt was you know made sense and was probably true, now has greater scientific backing. So somebody like me, I consider myself sort of a dinosaur in this field and being educated in the 1980s and the early 1990s, what I've seen since that time is this increase in our understanding and our willingness to accept that in a lot of different scenarios the need for daily protein intake is just flat out higher. So athletes and athletic performance really led the way, and I mean, now we are in recommendations zones where we are easily doubling the RDA and maybe a little bit more, 1.5 to 2 grams per kilo, across athletic populations. With that said, it makes you think that in these situations where there's sort of this metabolic change or demand or modification, more protein maybe important elsewhere.

So we also see this in weight management scenarios, when people are restricting calories back. And a lot of times in the past when they brought calories down, protein came down with it. And a lot of times in historical dieting, like I need to drop a few pounds, I am going to cut out the red meats and I am going to

reduce dairy and so forth. Protein just got sort of tossed out and what we know now is as we try to lose weight, protein and resistance exercise, higher intensity exercise are keys for maintaining the fat free mass which is so important and gives us a leg up on long term success. So, beyond sport nutrition, there's the application of protein in weight management. But we also see this in aging as well that as people get older that they become a little bit desensitized. And we are just saying that right now, desensitization to Leucine and total protein because we are just beginning to try to work our way through the mechanisms, but older individuals need more. And I think there needs to be a greater global attention on older individuals and making base recommendations for those individuals, bringing the RDAs up so that we can have better conversations about the importance of protein as we get older. I think the research clearly indicates that in order to get the same response for older individuals, from either a protein meal, the impact on muscle protein synthesis or from an exercise session and the impact of protein in elevating muscle protein synthesis above that, you just need more protein as you get older in that 50 plus sort of category. So in those scenarios protein just seems to be this amazing nutrient that's got great application regardless of what the metabolic need is.

So I think that's really exciting and a lot of us were protein fanatics. I had the pleasure of going to Graduate School of Florida State with Arnie Fernando and Kevin Tipton and we were big protein guys back then but protein just wasn't as entrenched in sport nutrition and elsewhere, but it was recognized as important in clinical scenarios that you needed more, if you were a burn patient or during pregnancy and so forth, but we hadn't applied it across. So, I think that's really interesting, and I think that other things that are interesting too is a lot of these nutrients that we have found to be helpful or beneficial in athletic performance, seem to have application across a broader range of human throughout life progression. A creatine is a really, really exciting nutrient outside of performance and we are really better understanding about potential benefits in other tissue in neurological tissue, in bone and so forth. And it just brings us back to this idea that do we know everything

that we need to know about creatine and maybe is this a nutrient that we should be extending beyond athletic performance.

I think there are several nutrients that are like this. Leucine as a branched-chain amino acid and its sort of triggering mechanism on not only muscle protein synthesis but also other tissue protein synthesis, and which is important across a variety of different populations but also the ability of branched-chain amino acids and probably Leucine with downstream metabolites having a dampening effect on the loss of body protein and muscle protein over time, sort of limiting or lessening muscle protein breakdown. And sometimes I think we get very focused on the muscle protein synthesis side and clearly you are not going to move forward without elevated muscle protein synthesis. And many people have nearly nailed that point, Stuart Phillips and others. But at the same time too, if you look at broader populations, if you can minimize muscle protein breakdown and total body breakdown rate over time, what's the help benefit of that as we age, as we tend to lose fat free mass, as we get older? Can we minimize sarcopenia? Can we improve the quality of life later on?

So I think that sport nutrition has a whole bunch of neat nutrients that we are finding to have really cool application for athletic performance and changes in body composition over time, and I think a lot of these nutrients have the ability to extend out into other populations very effectively, and then there's even some nutrients that are coming from other sort of categories of the industry which are coming into sport nutrition and becoming really, really exciting as well. Fish oil is one of them and DHA and perhaps the benefit that prophylactic fish oil consumption with DHA maybe having a protective effect or an injury recovery benefit for concussive head injury.

So on your side of the Atlantic, I mean you are talking about your football on our side of the Atlantic, we are talking about our football, so soccer headers, football, American football, high impact collisions. But a variety of different sports where they suffer some type of traumatic brain injury or concussive head injury and the possible benefits of the fish oil, fatty acids.

And I just think that's so exciting, how all of this is just changing the way that we think about key nutrients and nutrients in general, and opening up the whole 24-hour day. And I think sometimes we see this with dietary supplementation, like oh, I took my – I took that first thing in the morning. I am like – well, is that the best time to take it or should you split it up over the course of the day, is there a benefit to having an absorption of that nutrient over different time point in the day? I just think that there's so much more that we need to better understand to optimize, health, wellness as well as performance, self-satisfaction, liking the way we look, liking the way we perform, all of that, with good nutrition led by sound research.

DANNY LENNON: Yeah, I think that's an exceptionally important point and maybe one that's not made all that often of this real exciting, I suppose crossover that we are starting to see from both sports nutrition research into looking at health applications and vice versa like you outlined there. I mean, the fields of looking at protein from sport to looking then at sarcopenia and sarcopenic obesity is something we've talked about on the show before. Abbie Smith Ryan has mentioned around creatine and potential neurological disorders which you outlined. So I think they are really exciting going from this sports nutrition out to health, but on the reverse side we are seeing the same thing coming backwards of things that are typically looked at as maybe health interventions like using a probiotic and supplementing with Vitamin D or starting to see a lot of that emerging within the sports nutrition literature; how Vitamin D can affect muscle mass and function or probiotics for improving immune function within athletes. And it's exciting to see sports nutrition going that way as opposed to maybe the old kind of way that you mentioned many years ago, where people would consider what, say intra-workout supplementation we are going to use to fuel that one training session. So that's exciting how that whole field is changing to this broader perspective of developing an athlete overall including the health aspects, right?

ROBERT WILDMAN: Yeah. And if I can just add one more point that I think is really exciting and that is just our understanding now of the general safety of higher amounts of protein

intake over the course of the day. and going back to the idea that I did, I went through school and I was trained at universities and nutrition programs in the 80s and the 90s, and there was a lot of discussion and there was a lot of old thinking that protein was damaging to the kidneys, that it leached calcium from the bones and could lead to osteoporosis, led to liver dysfunction and really none of that has proven out over time. In fact, if anything, there's been reason to believe that higher protein intakes at the very least have no impact but potentially could have benefit.

DANNY LENNON: Yeah, I think that's a super important point and thankfully it seems to be at least becoming more and more prevalent within people's minds as more of this stuff gets pushed out and shown to people. So I think that's hopefully something that's going to be a net benefit for everyone overall. Robert, we are going to start rounding up here, so before I get to the very final question, for people listening, where is the best place they can find more of your work online, maybe find you on social media, any of that type of thing, where should they go online to check out more of that stuff?

ROBERT WILDMAN: My Twitter account is TheNutritionDoc. It's also my Instagram account. I have a website called thenutritiondr.com. Those are really sort of the best places. Outside of that I hit most of the expos, I am at FIBO, BodyPower, and then most of the ones in the US as well. So you can usually catch me at either PowerBar booth or the Dymatize booth or speaking at several of the ISSN events, those are fantastic.

I think the other thing that's really a lot of fun about everything that we do and you certainly are at the tip of the spear here is that it's a very gregarious group. It's a very cordial group. It's people that love to talk about what they do and love for people to ask questions and love to help and love to provide information and so forth. And I think sport nutrition, athletic performance nutrition is very unique that way, in that there's such a sharing and caring sort of mentality and atmosphere as to everything that we do and people just loved to reach out and talk and compare notes and research notes versus anecdotal notes in trying to find what's what. And that's just so exciting.

DANNY LENNON: Yeah, I couldn't agree more on that. And for everyone listening I will of course link up to all those things that Dr. Wildman just mentioned in the show notes for this episode. So that brings us to our final question that we always end the show on, and of course this can be to do with anything, even outside of today's topics. And Robert, this is, if you were to advise people to do one thing each day that would benefit their life in any aspect, what would that one thing be?

ROBERT WILDMAN: Challenge your muscle, and don't be afraid, and I think that all the great ways that the body can change over time, the stimulus of exercise, of movement, especially against resistance and some degree of higher intensity, moderately high to higher intensity, the benefits are only good. Little soreness aside or whatever, but if you want to – I mean if you want to look better, if you want to feel better, if you want to burn more calories – all of these different things, you have to move against, move with purpose is what I always say. and Brad Schoenfeld just – I think he just published a new paper, a new meta-analysis where his work is indicating that in a collection of about 20-21 studies where they used high intensity, high load resistance exercise versus a little bit lighter load, maybe an 85 to 65% of one repetition max, you can get the same benefits from a muscle mass standpoint or hypertrophy standpoint with even the lighter load. Of course strength is driven a little bit more by the heavier load, but it just opens it up to so many people that maybe they want to look like they exercise and they train, they want a little bit more muscle at any phase in their life, but they don't want to push heavy weight around or anything like that. And it just opens it up like you don't have to train like a power lifter in order to build muscle. In fact I work with a lot of bodybuilders that don't use heavy weights, and it just nails the point that really the benefits of some degree of higher intensity, moderately high intensity resistance exercise, almost anybody can do it, and get the benefits without having to go into a gold gym or world's gym or throw around super heavy weights.

DANNY LENNON: Yeah, a great point and I think a perfect way to round this episode out. So with that Dr. Wildman I want to say first of all thank you so much for your time and for

the great information you've provided here and for the work that you continue to do. It's very much appreciated. So thanks for being part of the show.

ROBERT WILDMAN: Thank you. I love everything that you do. Your podcasts are the best. Thanks so much Danny.

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