Danny Lennon: Hello and welcome to Sigma Nutrition Radio, the podcast that brings you evidence-based discussions with the world's leading researchers and practitioners in fields related to nutrition, health and athletic performance. I am your host, Danny Lennon, and you are listening to Episode 153. And on today's podcast, I'm delighted to have Dan Garner on the show. Dan is the founder of Team Garner, specializing in delivering consistent world-class results with a number of different athletes, helping them with their body composition and sporting performance. Dan has worked with a ton of different athletes from youth athletes but all the way up to elite-level NHL players, NFL players, Major League Baseball stars, UFC athletes including Michael Bisping. As well as that, he's also contributed to a number of different outlets online including writing pieces for Alan Aragon's Research Review.

The show notes to this episode are going to be over at SigmaNutrition.com/episode153, so SigmaNutrition.com slash Episode 1-5-3, and if you go there you can sign up to receive the transcripts to all of our podcasts, which you will be sent as a PDF direct to your inbox completely for free if you just sign up there, and also in that show notes page you'll be able to get links of where to find more about Dan and anything that's relevant to today's episode and what we end up discussing.

And just before we do begin, I want to remind you guys about the Sigma Weight Cutting System for MMA and boxing. This system is essentially a step-by-step science-based blueprint of how to fuel your training, cut

weight optimally and fight at your best. It will have a comprehensive manual to it, explanation video content, a ton of different resources that you can use to essentially customize and create your own diet and weight cut protocol based on all the science and the theory that we outline and then the practical steps to put that into place. You can then just plug in your own details and essentially create or get an idea of what your timeline should look like and how to organize your weight cut. So for any of you who are competing in such weight-class-based sports like MMA and boxing, or maybe you're a sports nutritionist or a head strength and conditioning coach to some of these athletes, I think this will be a really, really valuable tool. So for full details of that, just go over to SigmaNutrition.com/weightcut and that's just all the one word, so SigmaNutrition.com slash weight cut, and you'll get the full details of that system there. Check that out and if you think it's for you, hopefully it brings you a ton of value.

So with that, let's get into this week's show and let's get Dan Garner on the line.

Hey Dan, welcome to the show, my man. How are you doing?

Dan Garner: I am doing great today, Danny. Thanks for having me. How are you doing today?

Danny Lennon: I'm really good and I'm really looking forward to this conversation, I think some really cool areas that I hopefully want to explore. Before we get into some of that stuff, I think the best part is give us a rundown of your background, the people you work with, what you do day to day, just any relevant information for people to get to know you.

Dan Garner: Yeah, sure. Absolutely. So where I'm at right now, I'm a strength coach and nutrition specialist but definitely most known in the industry for my work in nutrition. I've built a couple of companies from the ground up. I operate 100% online at this point in time, having produced Amazon book and several ebooks and courses, and I do all of my training and nutritional coaching online as well. At this point in time, I'm working with UFC, NFL, NHL, MLB, and Olympian athletes, so that's where I've really worked myself up to in the industry at this point in time, is working with high-level athletes and getting those high-level athletes even better at doing what they're doing and typically positioning everything from a nutritional but also lab analysis standpoint with those guys just to make sure that they're covering absolutely 100% of their bases.

Danny Lennon: Awesome, and I think that's definitely the kind of roots I want to explore. Number one, I think like I'd mentioned to you previously, just being able to have that perspective of working with true elite-level athletes, I mean, those different contexts are really, really a view that not many people can share with. And also, the lab analysis is something I want to touch on perhaps later. But just to start, I think like you've mentioned you've worked with obviously NHL players, NFL athletes, and I think a lot of the time when I'm talking with different performance nutritionists who have worked within a team sports structure, one of the kind of big things is being able to balance giving recommendations to groups versus being able to work in-depth with one individual athlete. So just in terms of the scope of work you've done with some of those types of athletes, if it's being in a case where you've gone into a team scenario, how do you try and make that balance of taking into account individual needs while still being really I suppose time-efficient because it's obviously a time constraint working with larger groups and still being able to try and make some degree of context-specific information for athletes?

Dan Garner: Yeah, for sure. Well, I'm actually pretty lucky because I don't do the team thing.

Danny Lennon: Awesome.

Dan Garner: So I've stayed an independent nutrition specialist, and that's one of the reasons why I can work with such a wide variety of athletes because in many cases, if I was say the Houston Texans' team nutritionist, well, then that's really who I would be stuck with and doing that based on a contract basis. So right now, working with different guys in the UFC, NFL, NHL, I'm working with separate athletes at a time. So I wouldn't be speaking to the entire, say, Toronto Maple Leafs at one time. One of my clients is Frederik Andersen who's the current starting goalie. I'm just speaking to him, but what you said is still very relevant in that it has to be very time-specific because whether you're speaking to a team or not in a professional athlete world, these guys' schedules are nuts and they also are very also ingrained into their own rhythms, is probably the best way to put it. They are professional athletes, so it is very disadvantageous for any coach to go in and say, "Okay, you're doing everything wrong. This is what we need to do." You need to go in and understand their psychology and the way in which they like to prepare for certain events and be the tree that bends with the wind in some certain times and not try and change every single thing about their preparation, about what they do, because at the end of the day they're performing at a world-class level.

What my job is to do is to go in and find healing opportunities, is probably the best way to put it. You go in, you find a lot of healing opportunities, is probably the best way to put it. You go in, you find a lot of healing opportunities in where they're making mistakes and you alter those, but it's time constraint like I said in the beginning because their schedule is absolutely insane. So you have to be quick and targeted is a good way to put it, quick and targeted with your nutritional recommendations. You need to have your crosshair right on that healing opportunity so that when you hit it it's going to create a more dramatic effect because, I tell you man, someone is trying to take my job every single day. That's a part of being a nutrition specialist for professional athletes, is a lot of people want to work with them and, on top of this, a lot of people will say, "Well, hey, try this product for free and let me know what you think," or "Hey, I'll be your coach for free if you just let me promote you," or something like that. So what you have to do is you have to be very good at what you do but then also have your crosshairs on the target for sure to get a dramatic effect that works for the athlete all while balancing their psychology and rhythms at the same time. So I'm lucky in the fact that I can work with these guys on a one-on-one basis, which allows me to have all those balls in the air, but at the same time it's definitely time constraint because they don't have as much time as, say, us as trainers. They can't make their own meals on a 100% 24/7 basis or eat every two hours or whatever it's going to be. A lot of it has to be being the tree that bends with the wind.

Danny Lennon: Right. Yeah, I think that's such an important point because, I mean, particularly in the position where you're talking about working with individual athletes who then are within this team concept, because in some ways it could perhaps be easier to implement change on one level if someone does take that kind of…is seen as being over the whole group because kind of what that person says goes, but what I've found myself within even the combat sport arena is when someone has numerous other coaches and other members as a kind of a background team, trying to make changes can be particularly difficult I think a lot of times particularly within combat sports where there is a kind of a cultural side to it as well of what previous coaches would have done to make weight in the past with their athletes, and then now some [00:10:31] outsiders coming in to give different information. So, I mean, there's still that kind of blend of being able to fit into the kind of support group on the team network that that athlete already has, right?

Dan Garner: Yeah, absolutely, and there is still some support work to get through because each team generally does still have a nutrition specialist even though these athletes still go outside that nutrition specialist and hire myself. I would say it's easier with single sports like fighters. Like I'm sure that's very easy for yourself. You work with plenty of fighters and they don't have generally an assigned nutrition specialist or nutritionist or whatever it's going to be. It's really on them to get their nutrition right and then they can go and hire you and you can [00:11:18] the entire process.

But when it comes to a team, what I'll normally do is get in contact with their nutrition coach and see what supplementation they have available, what foods they have available, what's the scheduling, what's available on the plane, and what their schedule is, so what the practices, games and workouts are. So then once I have that information, then I can build my system with the highest-percentage chance of success rate for my client. Because if I just hand a professional athlete who's in season and traveling to different cities every single week for different games, if I just hand him a meal plan, it's a very low-percentage chance that he's going to be able to actually execute it. But if I know his schedule and what's available and all of the details behind everything, then I can line up the meal prep system exactly to his schedule so that there's not a lot of coaching on adherence in that respect. So I generally use that team that they have there in order to get information on the entire environment so that I can make the plan based on the environment because it doesn't matter what I do as a coach. Something I take a lot of pride in and I think that a bit of the industry doesn't fully grasp sometimes with this information-based Internet age that we have right now is the psychology behind things. Yes, I can make the absolute most scientific plan in the world for these guys, but what good is that best plan in the entire world if they can't follow it, right? So I get a full grip on their environment for that implementation and then, like you said, when it comes to the culture-based aspect of some coaches, old-school ways to cut weight or old-school ways to drop fat, like a lot of people still are in the "carbs make you fat" zone, that's something where an additional education process would have to be gone through with just myself and the athlete individually.

Danny Lennon: Yeah. I think that practicality is an important aspect because especially when we're looking at trying to implement evidence-based practice, I mean, from a starting foundational point that's great and all but, again, we have to make any decisions based on whether this is actually going to work for this specific individual athlete within their whole normal

schedule and who they are as a person, etc., etc., and there are certain things you pick up when you're working with these individuals in practice that isn't something that you're just going to pull from a research paper. So it's trying to blend the two of those. Can you maybe speak to the things that I think you have to learn by working and having that experience of working with elite athletes that you're just never going to get just from reading research?

Dan Garner: Yeah. Well, I mean, even outside of the scope of only working with elite athletes, I think that it's actually not…I think that it's important to not solely look at research 100% of the time. And I actually had to go through a type of growth spurt in my career a few years back where the evidence-based wave across the industry is probably the best thing that's ever happened to the industry. I really do believe that. In any memory of mine, I can't think of any wave that was more impactful in such a positive way to the industry than the evidence-based aspect of it. But I found myself getting very, very caught up in it in the fact that everything that I was saying at certain points in time was so context-specific and so 100% research-based and so all of these things that it got to a point where the recommendations weren't that helpful. Like you can only tell clients "calories are everything and macros are everything" so many times before you're almost—it feels like the industry kind of can do this often, right? We get into extremes on certain ends of the spectrum and what most people call it online is like "evidence-based people versus the bros." Bros can be on way one end of the spectrum where they lose the context of what the actual body of evidence has to say on certain topics and they miss out on a lot of intelligent implementation and strategies that they should be doing, and also strategies that they shouldn't be doing is probably a better way to put it, and then on the evidence-based side of it you can get to an extreme point where if you need a hundred studies in order to make any move within your coaching, then you're losing the art of what's supposed to happen. There's a science to the coaching and there's definitely an art to the coaching, and there's a blend that you need to have in order to be the most effective coach that you possibly can be.

And when I talk about the growth spurt I had a few years back, it was really kind of like those hermit crabs. I had to leave my shell and grow out of it and I had to go find a bigger shell to work through. And at this point in time, the psychology and the art is so important to me and I think that that can get lost on some evidence-based practitioners' approaches. And I feel like it gets lost, whether you like it or not, the more clients that you

work with because you're going to find that that approach, although 100% backed and makes total sense and has to be there for the industry to move in the right direction, won't work for everybody. You just can't tell people to eat a certain amount of calories and a certain amount of macros every day and get a successful result every time. It just simply won't happen. So there becomes a balance.

So getting back to the original question and why I prefaced my answer with that kind of rant there, is what people need to learn moving into working with elite athletes or working with anybody in general is the art behind things in the fact that you're going into their environment and they're probably not as excited about the nutrition meal plan as you are. So they're not going to make every single meal exactly the way it should be, and you'll get some people that will but many won't, and then you also have to adapt to their environment and adapt to their psychology. A line that I like to say to the coaches that I mentor is, "You need to meet the client where they need to be met." So you don't bring the client up to where you are. No, you need to meet the client where they need to be met. It's very similar to coaching a squat. If you have a brand new client come through the door and you give them…and you have a squat program for them and you say, "Okay, do a squat," they're going to be like…they're going to do an awful job performing the squat. Their posture could be rounded. Their knees could be buckling in. Their ankle stability could be off. Their elbows could be way out to the back. All these things can go wrong, and then every coach would say, "Well, yeah, of course it's going to be wrong. You didn't show them how to do it."

Well, the same can be with a meal plan. So if somebody comes through the door and they've never run a meal plan before that's been that specific and you just hand them the most advanced meal plan in history, then that's a mistake on your part, not on the client's part, if they're not totally adherent to it. So you need to look at their environment, meet them where they need to be met, and then be the tree that bends with their psychology. Because if a fighter is—just it's a great example just because you're really in this world. A fighter is a great example. Danny, how many rituals do fighters have leading up to a fight?

Danny Lennon: Right, yeah, it's crazy.

Dan Garner: It's crazy, right?

Danny Lennon: Yeah.

Dan Garner: And every athlete has these things. Before running marathons, you'll see some people, they eat the same meal every time. And then you go in there, and many times working with their psychology and optimizing their environment and not what you would exactly want to happen is the best thing that you can do for that athlete.

Danny Lennon: Yeah, totally agree, and I think it's so important when we're trying to again talk about evidence-based practice and again, like you said, it's just been such a net win for the industry…

Dan Garner: For sure.

Danny Lennon: But one thing I've said before is that, to your point, is that sometimes if you become so pulled down and burdened by needing to have every single caveat and piece of context placed on everything you say, then in the end you end up saying nothing because you can't simplify it for someone out of fear of saying, "Oh, well, someone could say this is slightly wrong or there's some kind of caveat to this," which I think is true when we're trying to make a point to other people in this arena, but when we're talking to clients in the real world it's a completely different scenario and we have to think about, "What does this guideline I'm about to give them, what will that do for them in practice? What are they actually going to do with it?" as opposed to how technically correct every single word you say is.

One thing that you brought up earlier, Dan, was around some lab analysis work you do with athletes and this is something that's particularly intriguing for me to hear about what you do. So can you maybe just give some context for people for what you're trying to use this for, how you go about that, and what kind of I suppose set of data that gives you on these athletes and how that informs what you do?

Dan Garner: Sure. So my approach is kind of like model-based thinking. So there are two real blocks of thinking towards my approach on coaching the people that I coach and getting the results that I get, and I call them the outside-in approach and the inside-out approach. So the outside-in approach is what we're impacting upon the client from the outside in from a formula-based standpoint. So we absolutely have to put energy balance at the top of the mountain. We all know this. We need energy balance at the top of the mountain and calories need to be set accordingly to meet the needs of the client, make sure that they're recovering from exercise and ready for the subsequent training sessions and/or performance events and/or they are gaining and losing weight at the appropriate rates, which can be anywhere

from half a percent to 1% of body weight. So that's an outside-in approach. We calculate calories and make sure that we're hitting our targets and covering our bases because that's a real tipping point that can be a make or break in any scenario. And then, we calculate our macronutrients. Okay. We set protein for the client. We set carbohydrates based on energy-system-specific demand of their training and their sport, and we set fats at certain levels in order to make sure the hormone and chemical messaging stays where it should be based on all the data that we have on calories and macronutrients. So these are formulas from the outside-in that we're placing on the client and they will take you so far, and that's why approaches like IIFYM and these things, they work. Whether people like it or not, IIFYM covers calories and it covers macronutrients, and you know why that works? Because it covers calories and it covers macronutrients.

Danny Lennon: Right.

Dan Garner: But, there's always a difference between good and optimal and when you're working with some of the best athletes in the world or if you really just want to get the best results possible for yourself and your clients, you have to consider what I call the inside-out as well. So outside-in is those formulas being places upon the client, and then we have the inside-out approach where we're looking at things that can affect performance, recovery and strength gains, fat loss, and all these different things. So we're looking at the gut microbiome. We're looking at thyroid health. We're looking at digestive health. We're looking at these important things – inflammation, stress. All these things play into the inside-out approach and you can do that with a well-designed questionnaire. So I'll have all my clients fill out a lifestyle-based questionnaire and then even a full questionnaire just based on sleep as well when they come to me, because I want to get an idea on everything that's going on with their life and with their sleep and with well-designed questions you can get insight towards what's going on in the inside-out. And the reason why is because these inside-out things can be a roadblock in many cases where the outside-in approach wouldn't catch it, things such as vitamin and mineral status, total stress load on the body, sleep, hormone balance, inflammation, how well the immune system's functioning, you know, like stress. Stress, for example, we've seen from Stolz et al. in 2014 when they separated two groups—one was low stress and one was higher stress—and they had them perform, I believe it was leg press, and the high-stress group took twice as long to recover and the high-stress group also reported more

fatigue and being even more sore from the same workout. So we know that the outside-in approach isn't the only thing that needs to be considered when it comes to getting 10 out of 10 results.

So I'm looking at labs and labs I think are an invaluable tool towards the inside-out approach. When we're looking at things from a lab perspective, it depends what you order. So I don’t have a set exact system for when people come to me because based on their questionnaires and based on the interview that I go through them, that's when I'm going to decide what’s going to be most beneficial, but something that I think could be valuable for the audience would be just to talk about the basics. What can you get in the basic complete blood count and comprehensive metabolic panel? These are covered by mostly any insurance so most people can get these straight up for free—well, at least where I live—and there you've got very basic markers. But even the basic markers can tell you something about the physiology to where at an end point you can connect to their performance recovery and results such as alkaline phosphatase or ALP, you'll see it for sure. It's located in several tissues in the liver and also in the bone, intestines, and in pregnant women it can be located in the placenta as well, but ALP is a member of a family of zinc-based metalloprotein enzymes and functions to break down proteins in the body. So when a decreased ALP is seen, it's associated with a zinc deficiency or a suboptimal zinc status.

So something as easy as ALP can give us an association on what’s going on with zinc in the body and I think that's really important to care about because in the study by Maxwell, I think it was in the late 2000s, it found that somebody within suboptimal zinc status improved their RMR with zinc alone by 992 calories over the course of four months. So it was found that zinc was so interconnected towards thyroid health that somebody with a suboptimal status was able to increase their RMR by over 900 calories in four months. Like that's an absolutely obscene number.

And even moving on, I mean, the examples could continue just on basic labs. Ferritin. Ferritin’s another one and it's abundant iron-bearing protein in the body and it functions as an iron storage depot for the liver and spleen. And it's been found in elite female volleyball players that if those elite female volleyball players taking iron compared to a control group that wasn't over the course of their 11-week competitive season, iron alone was found to be responsible for increases in strength gains compared to the control group. So we see these single minerals that could have an absolutely massive effect on physiology to where I believe that the

outside-in approach is only good up to a point to where the inside-out has to be taken into consideration.

Danny Lennon: Right. So you're stemming with that point of with these kind of comprehensive questionnaires that we're going to use that this will kind of give us some clues or maybe raise some red flags of particular areas that may, or may not, but may be an issue, and then they're the areas to focus on and get some more direct testing for. Then from that, that's going to give you the information to peel back and say, “Okay, now we can make these modifications either dietary or supplementation-wise to try and address some of maybe if that's a nutrient issue, for example, that we're kind of building out from that stem point and then allowing those dietary and supplemental changes to have benefits over time, right?

Dan Garner: Yeah, yeah, that's absolutely right. And like those examples I gave you were just from the basics but it always just depends on what I see, right? I mean, of course every question in nutrition with the answer, “It depends,” but I'll run everything from basics to comprehensive hormone profiles to intestinal permeability tests as well as digestive assessments through both what’s going on in the liver but also stool analysis. All of these things can give you some huge insight and can create some real big differences in athletes when you find healing opportunities.

Danny Lennon: And just on average, Dan, when you do start doing some of these testing with particularly new athletes that come to you, on average, how many if we're taking just a rough estimate of a broad group of athletes that have come to you, how many would have flagged something that shows something clear that may not be picked up on if someone isn't doing testing? How many of the athletes do actually have, say, a nutrient issue or a hormonal issue, etc.?

Dan Garner: I would say at least 40%. It's that high. So when you're not eating exactly the way you should be or even if you are but you travel a lot, you can pick up yeast, fungus or a parasite or have some sort of digestive inefficiency. So like and you ask me if there's something that we can improve, there's almost always something that we can improve because there's difference between a normal range and an optimal range, so there's something always that we can improve to get them just moving the needle closer to where they're outputting the best possible output that they possibly could. But then when it comes to something that can be an outright roadblock, then I would say 40% of the time we find a type of roadblock in their physiology that's not allowing them to perform. Remember, these people are athletes.

They're going to find a way around it. That's what they do. But, it's like the good analogy to put beside it is that they're like they're walking around with an anchor. They're kind of carrying an anchor around all the time and they're spinning their tires in the mud compared to if they had got rid of this issue, then they'd be able to move into their next step in the progression of their personal fulfillment, being the best athlete they can be.

Danny Lennon: Right, yeah. I mean, I see it all the time of we have athletes that have had massive success in spite of what they're doing rather than because of it because sometimes—like I'm sure you've seen—like their nutrition can be really poor, sleep sometimes can be poor, and they're still able to perform at a really high level relative to the rest of the population but probably just not where they could potentially be. And yeah, maybe it isn't all that surprising that there is a number of issues when you look at just what athletes put themselves through training-wise, especially if they're in a weight-class-based sport that they're often in periods where they're chronically in a hypocaloric diet. Throw in things like travel and stress, etc., etc., maybe it's not such a surprising issue.

For maybe athletes who are listening who are maybe interested in going down more this route and are interested in doing this, maybe they don't have someone to work with them on this right now, from a starting point we said there's probably something they can learn from maybe standard blood chemistry and some of the more basic testing. Are there any other tests that you advise that are going to be probably, I suppose, give a big picture…not a big-picture scenario but likely give big results from addressing that, if there's a couple that they could pick out to start from, usually provide some really good information that they could then bring to a practitioner and say, "This is where I'm at now. Can I get some help?"

Dan Garner: Yeah, for sure. So a couple of tests that can be indicators for a lot of things, first and foremost would be a salivary cortisol and DHEA panel. Some people tend to disagree with the salivary perspective but they absolutely cannot disagree in a salivary perspective when it comes to measuring cortisol values throughout the day in the environment that the person is supposed to be taking the cortisol samples as well as getting a DHEA average. So when you get those two markers, it tells you a ton about their stress hormone balance in the body, which then in turn can tell you a ton about how catabolic they can be, what's their blood sugar currently like, what is their oxidation damage currently looking like. Stress can also make its way into digestive issues. So you get a great marker on a

lot of things to where a four-point salivary cortisol and DHEA panel could give you indicators on many things that if you wanted to run further labs you could or if you could just fix it from there on.

And another lab that's absolutely beneficial to get and is extremely cost-effective is a comprehensive digestive stool analysis. A lot of people don't do stool analysis just for the sake that they are uncomfortable doing stool analysis and for no other reason, but it's unbelievable how many people have dysbiosis and bacterial issues that are causing inflammation and maldigestion issues in their body that simply just go undetected. Like waking up in the morning and having lean abs and then by the end of the day having a pregnant-looking belly, that's common but it's not normal. There is inflammation going on in the gut. You should not have a protruded pregnant belly by the end of the day. Something is going on there that's irritating the lining and it could be a number of things. But if people wanted—and I'm just saying cheap tests. Like the salivary cortisol and DHEA and stool analysis, those are cheaper ones for people that could be listening. More expensive ones of course cover more things, but I think that if you want to economically start that that would be an intelligent place to start in addition to just the basic labs like I talked about before like the CBC and the CMP.

Danny Lennon: Yeah. Is there any way for people to distinguish what is going to be a reputable good-quality test versus ones that are not? Because I'm sure they've seen all sorts of people telling them about different types of tests from different types of labs that are seemingly popping up all over the place now. Is there any way to ensure that they're getting it from a reputable company that actually has good-quality testing that is backed by science as opposed to something that may not be?

Dan Garner: Well, they can put effort into it, number one. So they could ask a specialist in the area what is reputable for the type of lab that they're after and, also, labs with nothing to hide provide you with tons of information. Genova is an excellent example of that. You go to their website, you're going to find references, more references than you'll ever need. You're going to find tons of information on everything that's behind it. So that's an excellent lab that I like to use, and it depends where my client is. So I've got clients all over the world right now, so like typically if somebody is in Australia/New-Zealand-ish area I'll use NutriPATH, but the US and Canada I like Genova, BioHealth and…that would be it, Genova and BioHealth. So I'll use those three labs primarily. I've used a ton of labs in

my day and those are the three that give the most consistent and accurate results and the ones that I utilize in my professional practice.

Danny Lennon: Okay. Awesome. Dan, just moving on, I did want to before I finish cover the topic of hydration status because I know back towards the start of this year you did a really excellent piece in Alan Aragon's research or view on hydration and some of the related topics to that for athletes, and as we know, most athletes when asked will at least say that they know hydration is important for performance. But when it really comes down to it, do you feel that many athletes actually know just how important optimal hydration is, and probably even beyond that, what optimal hydration even encompasses and what that actually is as opposed to what they think it is?

Dan Garner: Yeah. So I think that a lot of people just think hydration is water. So I think that that's really all they think about and, you know, they have a right to think about it that way, right? But there's definitely a lot more to it in that there's a huge component that electrolytes play into performance, and electrolytes honestly have got to be one of the most underrated I would say performance supplements out there. They kind of go under the radar but you can't contract and relax muscle properly without the adequate hydration and electrolyte balance. So I would say I think a lot of people know hydration's important, but then couldn't really elaborate on it. They're just like, "Yeah, it's kind of important." But there's a big balance that needs to be in place and it's really the different kind of…you know, we talked about energy balance, right, energy in versus energy out? But you can think about it like that for fluid as well. You have fluid in versus fluid out, and then it equals your net water balance. Our fluid-in sources come from food, so they come from fruits and vegetables containing the most water. Water-cooked carbohydrates as well can have a lot of water in them such as rice or oats, and of course, water sources as well are into the fluid-in equation like water, sports drinks and absolutely coffee. A lot of people still believe that coffee does have a diuretic effect and, although it does decrease water quite a bit, it doesn't decrease more water than it provides you. So the actual net gain in the end, coffee is still a hydrating drink.

So that's our fluid in, and then in the fluid out, we actually lose a lot of our humidity in fluid on a day-to-day basis just through respiration and ventilation. We have a fluid out in the evaporation of the skin. We sweat, and if there's one thing that individual variance affects in nutrition it's sweat rate. So you'll have two people performing the same workout and one guy could be sweating a ton and the other guy will hardly be sweating

at all, and this changes their water intake recommendations quite a bit but then also their electrolyte balance quite a bit as well. And then, there's also even a third type of sweater. I call them salty sweaters. If you have somebody who sweats and then they get up off of whatever machine they're on and there's kind of a white lining around their sweat, then that's a salty sweater. So they lose more salt than your average person.

So that's kind of like the fluid in versus fluid out balance where people need to be. The Institute of Medicine determined that an adequate intake for men is about 13 cups, which is around three-ish liters of water, of total beverages per day. I would recommend just water especially for the athletes that are probably listening to this. That's for men, and for women it's nine cups, but honestly I like the recommendation that Lyle McDonald made because Lyle McDonald's recommendation covers individual variance. So he said, I won't remember the quote exactly but he said something like, "Your pee should be clear or slightly yellow throughout the whole day, and if you're peeing five times throughout the day and twice after a workout you're doing pretty good." But that really takes care of individual variation by itself because it's talking about urination and the color as opposed to just total load. It's kind of like the food pyramid recommendations which just say, "Have eight glasses of water for a day." Well, my water intake's probably going to be different than Andrey Malanichev's. So we can't really just slap one intake on everybody. So I like the body weight recommendations or, honestly, I like Lyle McDonald's recommendations because it's super-simple and it accounts for individual variance.

But where things get more interesting in terms of hydration is when people actually start caring about it when they decide, and discover is a better way to put it, the level of negative implications that dehydration can have on performance. It's been shown that a half a loss in body water increases your cardiac output. So this is going to be more stress on the heart. This is going to increase your heart rate, and heart rate's of course associated with exercise-induced fatigue. So just with a half a percent loss in body water we're already running into some cardiac stress issues. With a 1% loss in body water, we've decreased our aerobic endurance, so our actual cardiovascular ability is starting to decrease at this point. A 3% loss in body water reduces muscular endurance. So the best way to think about this is say if you're doing like a set of 15, 20 or 25 that a 3% loss in water is really going to hurt this muscular endurance in these type of events. A 4% loss in body water reduces your muscular strength but then also your

motor skills as well. So your actual athletic ability kind of starts taking a hit here. And then at a 5% loss in water, that's when you start running into some serious things like heat exhaustion, serious cramping, fatigue, and then at a 5% loss in water that's actually been shown to decrease your mental capacity as well.

So that's how it connects so intimately with people's performance and it kind of makes, yes, hydration so important, but it kind of makes planning even more important because if at a half a percent loss in body water we're already running into issues, then you should pre-plan ahead of time especially if you're a heavy sweater performing in the heat, because people can lose up to two quarts of sweat per hour but the small intestine can only maximally absorb one quart of water per hour. So we're running into a losing battle but that losing battle becomes even more of a losing battle if we aren't hydrating properly. And of course, the temperature at which you train plays a huge impact on that and we've seen in research that exercising in temperatures from 11 to 21 degrees Celsius shows the greatest performance benefits where exercising below 4 or above 31 creates the quickest times to fatigue. So there's a lot of things in the air when it comes towards your hydration and water's only one component.

The other components are making sure your electrolytes are coming in every day. So what's potassium, sodium, calcium, and magnesium doing in the body? Because a lot of people aren't getting enough magnesium in per day and it's actually been estimated that 15 to 50% of the American population doesn't get enough magnesium and up to 75% of Americans are deficient in magnesium, and that's really important to care about because although sodium is a real heavy hitter for muscular contraction, potassium is muscular relaxation, but magnesium is what regulates the intercellular pathways of both sodium and potassium going on in and out of the cell. So it's kind of like the bodyguard. It's like that old biology experiment in high school when everybody's got a dead frog on their desk and if you put salt on the legs it'll start dancing, it'll start contracting, and that's because salt causes contractions. But if you sprinkle a little potassium on it, his dancing legs will start to calm down. And this is the difference with sodium and potassium and their connection to electrolytes and muscular contraction and athletic performance, but without magnesium—he's the doorman. He's what's helping both sodium and potassium. So it's a balance of all of them and the athlete needs to make sure that these minerals all need to be coming in in the adequate amount per day based on their sweat rate so that they're not affecting their

performance because, like I said before, very small dehydration issues cause performance detriments, and to me it's really silly if you're not performing to your optimal ability because you didn't hydrate properly. That's a very easy thing to do and that shouldn't be something that's holding you back in your athletic endeavors.

Danny Lennon: Right. And so when it comes to assessing hydration status with athletes, is for example using the urine color chart to kind of give an idea of where they're hydration status is at, is that adequate for most of them? Or when we consider then more advanced forms of hydration testing and looking at electrolyte balance, does any of that come into play with some of the higher-end athletes?

Dan Garner: Yeah, for sure. So I order a panel on a lot of my athletes known as the Genova Cardio Ion and that comes with blood and hormones and vitamins and minerals and electrolytes and organic acids. So it's a very comprehensive panel and that has electrolyte status right on it, so the people who can afford that, that is an excellent thing to get although you can, in most basic panels, sodium and potassium are already right there for you. So those are clear indicators on your hydration status. The easiest one to do is the urine color chart. That's very, very easy and very, very effective. There's no real lab need for hydration, although it's beneficial to have on panels, especially for magnesium since so many people are low.

Some things that a practitioner could look at for hydration status would be the urine color chart, electrolytes within lab analysis but then also something like, what are your red blood cells doing? So like on a lab analysis, your mean corpuscular volume or MCV you'll see it as, if they're higher than what they normally should be, this is also an indicator of chronic dehydration. So if they're larger than they should be, it's an indicator of chronic dehydration and it's also an indicator of B12 or folate suboptimal or deficiency as well, so B12 or folate anemia going on. So you can get indicators from hydration looking at those three things but then also just what your red blood cells are doing.

But a lot of this wouldn't be necessary for 90% of the people listening right now for sure because the athletes, the professional athletes, they're working out for hours and hours and hours a day and then also competing very, very hard as well, so it would be necessary for them. I think that simply the urine color chart would be big for a lot of these people and having a look at their potassium though, too, just because potassium’s so bad. And I'm talking about US data, but it's probably pretty extractable to

a lot of other countries as well because there's data suggesting that 99.4% of the US population over-consumes sodium but then less than 2% of the population meets daily recommendation for potassium, which is actually 4.7 grams. So there's a huge difference there and like I just said earlier, they're both required for contraction and relaxation, which are both required for hydration and performance. But that's something that comes on the basic panel. It should, anyway, your potassium. So it's something that would help a lot of people out in making sure that they're getting enough potassium in daily.

Danny Lennon: Yeah, that's a really important point. And that kind of ties into, I was going to ask about, obviously when someone is doing a very light session where they're not sweating that much or someone just goes in to do a casual gym session, they can probably get through that and just maybe drink some water to stay hydrated. But when we're talking about athletes with these higher amounts of sweating going on, so whether that's an individual high sweat rate, whether it's in a long-duration type of training session, whether it's super-intense or maybe they're doing some Brazilian jiu-jitsu, for example, for a couple of hours in a warm room and they're sweating tons, obviously then we have more of a need to be paid attention to electrolyte intake, and I know you mentioned earlier electrolyte supplementation can be really effective as part of a performance supplementation strategy. So when it comes to the context where electrolyte supplementation may be warranted, maybe as kind of like a two-part question, first, what is that kind of cutoff do you see of what types of scenarios where athletes should be supplementing the fluids they take within a session and afterwards with electrolytes? And secondly, based on your last statement around how many people already take in a ton of sodium but very little potassium, does that change then what you would ideally like see people do in terms of supplementation, in terms of, do they need to get a particular amount of potassium and sodium as opposed to going with something like Dioralyte or a powdered electrolyte supplement that's commercially available?

Dan Garner: Yeah. So you want to look at the ratio. You would at least want a one-to-one ratio of potassium and sodium. I think that that is a much more advantageous way in which to approach your intra workout or intra game or intra practice hydration needs. And the problem is big-name sports electrolyte drinks, which I won't name but you know them, they have much higher sodium and such little potassium almost to a 4:1 point and it really doesn’t make any sense to me because, why do we have a 4:1 ratio

of sodium to potassium when nobody's eating potassium but everyone's overeating sodium? So we have already enough sodium kicking around. So I like to bump it up to at least a one-to-one ratio of sodium to potassium and you can do that with supplementation or you can do that simply with coconut water and adding a pinch of salt. So coconut water already has a ton of potassium in it and actually not a lot of sodium, so in that sense you could have coconut water with a pinch of salt in it and do that yourself for a more close 1:1 ratio of what's going on.

And that would really cover the electrolyte component of it, but when it comes to the environment, my rules, I generally do it anyways, so if somebody is doing a super-light workout, like they're just doing light cardio and abs, then like I don't really care. But if it's going to be any resistance training session or any practice or any game or if they're training in the heat or if they know they're a heavy sweater, we're going to be working on intra workout hydration and really just intra workout nutrition in general, hydration just becomes a big component of that. So once our ratio of electrolytes makes a lot more sense for what the population and the data has to say about performance and eating habits, we start looking at how we're going to optimize this. So how are we going to optimize it? Well, there are a lot of things that we can do but to make a long story short, we're generally going to want to make a 6 to 8% solution for athletes who are training, and what that means is that only 6 to 8% of your drink should be in the form of solids compared to liquids. So what that looks like in the real world is 8% of 500 milliliters, which is a standard water bottle, is 40 grams. So the maximum amount of solids that you should put into a water bottle's worth of water would be 40 grams, and we keep it 6 to 8% because this is what's going to actually decrease any and all GI distress or GI backup. You can only hydrate and deliver nutrients so fast. If it could just happen instantly, then we could chug a bottle and it would immediately happen. We would never get GI distress. But the small intestine doesn't work that way. There are only so many transporters waiting on the outside of the small intestine in order to deliver sodium, electrolytes, carbohydrates, and water to the muscle cell at a certain rate. So we keep a solution of 6 to 8% in that formula to make sure that we're meeting the demands of the athlete but also meeting the demands and respecting the small intestine's hydration rate and the ability that it has to deliver nutrients from the small intestine to the muscle cell.

So now we've done two things. We've got our ratio right and we've got our solution right. So now what else are we going to put in it? Carbohydrates

are beneficial for athletes period. I think it's very clear at this point in time within the data that carbohydrates, athletes do need them and that performance will suffer if they do not, especially my athletes. I mean, NFL, NHL, UFC, it's very glycolytic. It's basically supply and demand. You've got to meet the demand of the athlete and the energy-system-specific performance. So we're utilizing carbohydrates, but carbohydrates have a different component to them as well in that carbohydrates are actually going to help pull more water out of the intestine and electrolytes as well.

So we've got a combination now of our electrolytes, water and carbs, and then another thing that's beneficial to add is actually glutamine. A lot of people will harp on glutamine because of its basically zero effects on body composition and different other markers that people hype it…bodybuilders in particular hype it up about, but glutamine helps with hydration. So I'm not opposed to putting it into intra workouts at all because glutamine independently can help grab and pull sodium out of the small intestine and along with that sodium pull water out of the intestine.

So we're just maximizing different transporters. We're hydrating with our water, we've got our electrolyte balance in check, but then we're using carbs and glutamine in there to maximize different transporter pathways to optimize hydration rate during exercise, and then I generally like to utilize essential amino acids or just a whey protein during exercise as well in order to just help out with the preventing the protein breakdown component of it if the training session is intense and exceeds 90 minutes.

Danny Lennon: Perfect. I think that gives people a really good breakdown of where we're going with that, Dan, and I'm glad you actually gave those recommendations because when it comes to rehydration for MMA and boxing athletes people have seen a lot of the hydration protocol that we employ goes by some of those numbers you mentioned in terms of about 70, 80 grams of total powder per liter of water that they can then consume after the weigh-in with some of those compounds you mentioned. So I'm glad you bring it up.

Dan Garner: [Chuckles] That's funny. Well, it's just correct thing to do, right?

Danny Lennon: Awesome, yeah. Dan, we're coming close to time so, before I get to the final question, let people know where they can find more of your stuff online, what they can check out, and send them to any kind of links that you want to make people aware of.

Dan Garner: Yeah, for sure. So, first and foremost, I'm going on a seminar tour. I'm talking a lot about both my outside-in and my inside-out approach. So 2017 is going to be the year I start doing more touring. I've been a 100% coach just gaining a ton of experience for my whole career and I'm ready to really educate people on how I get the results that I get. So I'm touring. Official dates are January 14th and 15th in Brisbane, Australia, and then January 22nd and 23rd in Perth, Australia. So those two-day workshops in both locations, and then to-be-announced dates as well for Canada and the US for later in 2017.

On Facebook is really the only social media that I do. It's all I can handle as far as social media goes. I just can't really…I can't keep up with all the moving parts of Instagram, Twitter, Facebook, and all of that. I'm pretty old-school. So I do have a Facebook account though and I do post on it almost every day with video and post and image content talking about this kind of stuff really, just talking shop and giving tips and good stuff. So that's at Dan Garner, Strength Coach and Nutrition Specialist on Facebook.

And then for any hockey players listening right now or any potential hockey coaches listening, I have a very comprehensive website as well, HockeyTraining.com.

Danny Lennon: Awesome, and all that stuff will be linked in the show notes for everyone listening and I obviously encourage you to go and check that stuff out and keep up to date with the content that Dan is putting out. So Dan, that brings us to the final question that we always end the show on and this can be to do with any topic that you wish, and it's simply if you could advise people to do one thing each day that would have some positive impact on any aspect of their life, what would that one thing be?

Dan Garner: Oh that's a good one. Well, for the coaches on here, yeah, yeah, okay, so for the coaches on here, honestly, I would say information constipation. I think that with the current state of education popularity in the health and fitness industry alongside what the Internet brought us with all the bloggers' posts, podcasts, courses, that everybody is really completely overloaded with information but they're starving for wisdom. All coaches who consistently bounce from one thing to the next as far as education goes would benefit immensely from taking a step back and applying what they've learned first to gain further experience and wisdom. Like if you know a hundred systems but don't have any experience on any of them, you're still at step one in my opinion. You need to take a step back, take a

deep breath, internalize what you've learned at any certification course, blog post or anything, and then apply it to yourself and your clientele because when you do this, that's when you're going to combine both the science and art of coaching and you need both to be the strongest version of yourself.

Danny Lennon: Yeah, great advice and I think something that people really, really do need to bear in mind. I'm glad you ended on that note, Dan. It's been a pleasure having you on, a really good conversation. The time has flown here and I've really enjoyed chatting over this stuff with you and I'm sure we'll do this again at some point and we'll have a round two because there's probably so much more that we could get into. So thanks so much for your time today, my friend.

Dan Garner: Thank you for having me and I'd be happy to come back.

Danny Lennon: So there we go. In the show notes, I'm going to link up to some of Dan's work where you can connect online with him and you also have the option to get the full transcript to this and all the other episodes for absolutely free, and that will be at SigmaNutrition.com/epi153. If you want to find me on social media, then either just search for Sigma Nutrition and Performance on Facebook or follow me on Instagram at my handle, dannylennon_sigmanutrition.

And remember, for those of you interested in the Sigma Weight Cutting system for MM" and boxing, just go to SigmaNutrition.com/weightcut. And really, if you just go to Sigma Nutrition Radio everything is available there – the podcast, articles, information about our online coaching service, and then obviously the weight cutting and also where you can get hold of some Sigma Nutrition and Performance T-shirts. And so everything is there at the central hub of SigmaNutrition.com.

And that brings this week's episode to a close. I really hope you enjoyed the episode and, if you did, I'd be grateful to anyone who shares on social media or passes it on to someone. Let's try and help get more good scientific information out there to counteract all the nonsense we regularly hear and, hopefully, this podcast is one of the places that tries to promote evidence-based practice and tries to go by science at least to the best that we're capable of.

So I will talk to you in the next episode. Next couple of weeks we have some really cool episodes up. We're going to be talking with Jeff Rothschild about intermittent fasting, time-restricted feeding windows,

how that potentially ties into circadian biology and circadian rhythms, etc., etc., some really cool stuff. That's coming up on next week's show. And then, we also are going to be talking with Dr. Kimber Stanhope of UC Davis who is probably one of the most well-renowned researchers who has looked at the effects of sugar consumption and the differences in, say, fructose and glucose metabolism and how these things affect health markers and body composition. And so Kimber is going to be on the show to give us a kind of from-the-frontlines view of what the research actually says on sugar consumption and how it plays into health, and to come directly from the people who are doing the research as opposed to a lot of the kind of nonsense we may often find. So they're the next couple of shows, Jeff Rothschild, Kimber Stanhope, coming up. If you want to make sure you get them, then please do make sure you're subscribed to the podcast, so whether you listen in iTunes, Stitcher or whatever app you have that you listen to the show, make sure you've hit that Subscribe button. It really, really will make sure that you get access to these. And if you do like the show whilst you're there, please maybe leave a review.

So that is it for our episode this week. Thank you again so much for listening. It's amazing to see so many of you continuing to be listening to the show and enjoying it, so thank you so much for making it what it is. I will talk to you next week.

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