



DANNY LENNON: Brandon welcome to the podcast my man. How are you doing?

BRANDON ROBERTS: Doing well, Danny, thanks for having me on. I appreciate it.

DANNY LENNON: Yeah, my pleasure. This is an area that I think is going to be particularly interesting to a lot of listeners today and certainly the two research papers we are going to dive in a bit of depth into throw up a few interesting questions as well, which we can probably talk about as the show goes on. But before we get to any of those specific papers, just to give people listening an introduction to yourself, your own background, your career in academia, what you are currently up to inside and outside of academia right now. Let people know who you are and what you are doing.

BRANDON ROBERTS: I have a lot of hats. Currently, a post-doc at UAB and my project is centered around the inflammatory response to resistance training and how that affects kind of hypertrophy. I also coach physique and powerlifting athletes with the strength guides. And then kind of my spare time, I write a little bit. So that's the main three things.

DANNY LENNON: The two papers we are going to look at for anyone listening, they will be linked up in the show notes to this episode Sigma Nutrition, so you can go over, pull up the text to those if you wish and have a read-

through yourself before and after listening. But the first paper we are going to look at is a paper from August 2017 by Pardue, et al. This was a case study titled Unfavorable but Transient Physiological Changes During Contest Preparation in a Drug-Free Male Bodybuilder. So, with this study Brandon, I think maybe the first thing to address for people is obviously this is a case study and while it doesn't have a whole host of subjects, in fact only one, why do you think case studies like this could be particularly interesting and important and what can they show us that maybe we wouldn't be able to get from something with a lot more subjects?

BRANDON ROBERTS: In the bodybuilding research field, it's a small kind of subset of people. So case studies allow you to kind of delve a little bit deeper than maybe a clinical trial would. They are not judged as harshly, because you can't get as many people to do them. But it's pretty extreme as far as body composition type measures. And they are really, really long and actually they are getting longer. So this is 13 months and that to run a study for 13 months is quite a while. So I think that's the main kind of takeaways from the case studies.

DANNY LENNON: Sure, and you mentioned the level of detail you can get into. So maybe just to outline for people what is the kind of overview of how this case study was set up, what are they evaluating and so on?

BRANDON ROBERTS: So this was again 13 months and they had eight months of kind of a contest prep period and then five months of recovery. They took quite a few measures. I was kind of impressed with that. They looked at kind of testosterone, ghrelin, leptin, the thyroid hormones T3 and T4. Then they also looked at RMR, so metabolic rate, along with some kind of performance measures, force and power. And then finally, they did something which actually is why I picked this study which was the sleep aspect, because nobody's really looked at that yet. So to track all those from the beginning to the end of competition, and then into recovery, and they have a number of time points too, so that really adds to the weight of the study.

DANNY LENNON: Awesome. And just on the – before we delve a bit deeper into the actual results that we got on some of

those things, when we look at the baseline statistics for this particular person, looking at their diet and training, what exactly are we seeing in terms of the dietary and training that was involved during this contest preparation period, because presumably that's going to have some degree of knock-on effect of what we might expect to see during that eight-month contest?

BRANDON ROBERTS: Yeah, so I wouldn't say it's a standard kind of training split but if you look at the literature, it's a normal training split for bodybuilder and kind of everything twice a week. The frequency was six days a week and then they had one rest day. Nutrition wise, high protein, medium to high carbs at the start or actually it was pretty high carb, and then fat was pretty normal, so, no extreme diets, no kind of baseline abnormalities.

DANNY LENNON: So let's start digging into some of the results here. Where is the best place to start here? What's the first few things that stick out in terms of the results that we see in this particular case study?

BRANDON ROBERTS: The main question bodybuilders have is, what body fat percentage do they get to – so if you look at the DEXA specifically, that's what most people in this literature use. You see the body-fat decreases to about 5% pre-competition, and then coming out of the competition, five months later, it's back up to 13% which is kind of where they started. The other question, and to keep track of, is lean body mass. We want to know how much muscle did we lose, is there a better way or best way to retain this muscle during prep because as bodybuilders we want to show off that muscle but we want to keep it, because we want to progress across our careers essentially. So I think that's the biggest kind of take-home from this is that it took five months post contest to get relatively the same lean mass and body fat percentage.

DANNY LENNON: Yeah, that was super interesting. One thing that I did see was – and that was a kind of cool aspect of this study is that they look or going to measure body fat percentage using both DEXA and Bod Pod, so using both of those measures maybe and to try and cross-reference them. One of the things that people see if

they look through this paper is that the reported numbers for that body fat percentage is different between those two measures and then that also infers that there's a different amount of fat free mass that was lost depending on whether you are looking at Bod Pod and DEXA. So, first of all, just in more maybe of a general sense, what kind of issues do you think this throws up when we are trying to maybe compare studies based on what measure they use, either DAXA or Bod Pod and then in a practical setting do we have an idea of maybe what, at least for this type of population, would be maybe a better measure or more likely to be closer to accurate?

BRANDON ROBERTS: Most kind of exercise centers or clinical trial centers have one of them and maybe not both of them, and in a literature most people use DAXA. Now, DAXA can be influenced by kind of glycogen, water, things like that, but if you do it right, it's pretty accurate. I think that the best measure, and this was actually only done in one bodybuilding case study, is a four-compartment model which uses BIA to kind of counterbalance the water volume within your body. So it's harder to do obviously, but it would have been neat to see how that compares to the body fat percentage of DEXA and Bod Pod.

DANNY LENNON: Right. So outside of those changes in body fat percentage, you mentioned some of the other things that were measured throughout the study, what sort of results should we see there and what sort of changes did we see that kind of stuck out to you?

BRANDON ROBERTS: If you look at the rest of the literature, there's a pretty standard decrease in testosterone and increase in cortisol. And so they found this but over more time points than before I think. And then a drop in kind of the thyroid hormones, so basically metabolism markers, so T3 and T4 dropped a little bit which is also pretty normal. Obviously, as we get leaner, we get more fatigued because we've been dieting for a long time, our strength and power and pretty much any measure of that drops off towards contest, and then probably the most interesting – and they did touch on this in the discussion, was the metabolic rate drop, and it wasn't a whole lot, I think it was like a 2100 calories to about 1900, but then it took a while to

rebound and come back up to baseline measures. So I don't think they actually hit their baseline again after contest.

So that was something worth touching on and I think is interesting and maybe going forward we use that, because ultimately body weight regain is dependent on how many calories you are burning. And we don't want to put on a whole bunch of fat in between contests. And then lastly – so sleep duration is another cool finding and they found that sleep duration actually increased into contest preps and then kind of stayed the same, and then sleep efficiency also did the same thing. And if you look or you coach the athletes, they always complain of sleep, kind of deteriorating towards contest preps. So that was interesting to see and kind of more of an objective measure of sleep.

DANNY LENNON:

Yeah, two really important things that I want to get a bit more into that you mentioned there. First, if we start with resting metabolic rate, like you said, that dropped by a few hundred calories over the course of that contest prep, but even five months afterwards it hadn't – although it was trending back up towards that, it hadn't come back to that original baseline which number one is interesting, we can talk about. And the second is that one thing that I think they also mentioned was that that resting metabolic rate decrease was that reduction was actually beyond what you would have explained purely by fat free mass loss. So maybe we can get into that what other potential mechanisms are going on there to explain why that resting metabolic rate would have dropped more than merely what would have changed via the loss of fat free mass.

BRANDON ROBERTS:

So I think if you look back at the hormonal figure, this probably tells most of the story, because if you compare the RMR to the hormone kind of panel, you will see that the T3 and T4 aren't quite back to baseline, nor is testosterone. I mean, they are probably close enough, but I think that kind of discrepancy is causing the effect. Now, in the literature if you look all the way back to Ancel Keys – the Minnesota Starvation Experiment, we know that this adaptive thermogenesis kind of occurs and we

can't explain part of it. And I am not sure we know the true reason, like I don't know if there's been a study to specifically look at it, but it is very common in physique athletes and I believe some other sport athletes too.

DANNY LENNON:

So, with that then presumably the practical implication for people to be aware of is after that competition and after the contest is done that kind of recovery period, if they are trying to get an estimate of maybe where a suitable caloric intake might be, just being aware of that even when they do regain some of that weight their resting metabolic rate may still be slightly decreased – again, not a huge amount, but slightly decreased to what it maybe previously been in off-season for example?

BRANDON ROBERTS:

Yeah, definitely. If you are – I mean, resting metabolic rate isn't the whole story, because you have physical activity neat, your diet, thermic diet, food might change a little bit, so you have a lot of factors. But if you are over-shooting your calories by hundred per day for a few months, you are probably going to gain some fat whereas maybe before you were gaining a little more muscle. So it is something to keep in mind.

DANNY LENNON:

Sure. Before we move into that kind of recovery phase I wanted to touch again on the sleep piece that you mentioned, which, like you say, was really interesting, in that anecdotally a lot of bodybuilders will mention how their sleep quality gets poor during a contest prep. And in fact in this, actually the kind of subjective measures they looked at, the same was reported, this subjective decrease in sleep quality, although that was different to what we see with more of those objective measures. Is there anything that we could even point to that might explain some of the reasons why we don't see actually a decrease in these objective measures of what actually happened with sleep duration and efficacy, yet the athlete is still feeling like their sleep quality is markedly worse?

BRANDON ROBERTS:

So, I think, this is more on the behavioral side. So if you think about sleep and prep, you are pretty fatigued, especially towards the end of prep when it really kind of starts to matter. So I think it's a combination of the training, trying to hold onto that

lean body mass, you are not adjusting your training much, and then just overall fatigue setting and kind of the prep just wearing on you essentially. So I would point that out and I do think it's really interesting because I can remember during my prep like I would sleep what I thought was maybe five or six hours and just be fully energized afterwards. But this is kind of totally different story.

DANNY LENNON:

Yeah. I definitely find that super interesting and it will be interesting to see to where more research goes to maybe try and look into that more. One of the other things I was going to ask you about was that recovery phase, the five months after the contest prep, they actually mentioned within the paper that it was essentially this reverse dieting protocol that the person had undergone where they would increase their carbohydrates by somewhere between 10 to 30 grams per week and/or 4 to 10 grams of fat increased each week with slight reductions in aerobic exercise as well.

So with that nature of reverse diet, that kind of throws up maybe a broader discussion that has become maybe kind of slightly debated I think within bodybuilding circles over how best to kind of structure that recovery period. So it would be interesting to ask your thoughts based on both what you've done as a coach with competitors but also from your reading of the research on the kind of speed of a reverse diet so to speak of how quickly to increase that food intake back up. Obviously, on the one hand if we jump up and let someone go completely crazy, they can overshoot and gain quite a lot of body fat. But on the flip side is there – we obviously know there's going to be some negative; if you increase food intake too slowly, you are basically just putting off getting back to normal maintenance and having to gain back some of that body fat that's required to reverse some of these adaptations. So based on that, what are your just general thoughts on the speed of reducing food intake and/or gaining body weight and body fat back in that kind of post contest window?

BRANDON ROBERTS:

So, if you look at the literature what you find is most people gain anywhere from like two to five kilos post contest, and it's pretty quick. Bodybuilders are kind of

known for binging after shows, but I think that's changing, and I think that's smart. There is probably – and when you get around competition, I guess to back up for a second, you are loading water, you are peaking and then you don't have a really great measure of bodyweight until maybe a couple of days after competition. So I would say the rate at which they increased calories in this study was very comparable to what most coaches do. It might be a little bit slow too actually. But they had – and I am not sure I would like to see this in the study – they had the RMR and they had the fat free mass, so they could have calculated a kind of predicted caloric intake and just said, hey we are going to jump to that and go from there.

Now, in the coaching world, you don't have those measures, so you probably want to increase calories, maybe 500 per day and kind of see where that goes, and then make adjustments week to week based on how much weight they are gaining, how they are feeling. Obviously, the performance is going to go right back up. So that's kind of my idea on recovery diets.

DANNY LENNON:

Right. And I think perhaps one of the pieces might get missed and maybe you can put some commentary to this, is that when people think about the process of a reverse diet and coming very slowly out of it, with the idea of minimizing the amount of fat that they are going to gain, sure, we don't want them to gain huge amounts or excessive amounts. But this idea that you can kind of slowly come up to the higher level of calories and back to full hormonal health, without any gain of fat is kind of illogical, so like that fat gain in and of itself for that increase in bodyweight is almost part of that recovery. Do you have any kind of thoughts or have seen maybe some misconceptions around what needs to be done in that kind of recovery phase that people might get wrong from time to time?

BRANDON ROBERTS:

Yeah, so most people try to hold onto their leanness too long and I am going to probably blame social media on that. But like you said, you do need to put some fat on, you are hormonally debated essentially. So trying to hold onto that low body fat, that contest body is not really feasible nor is it smart in the long

term. You will see a lot of people – and I was reading about this the other day – that think you can make these really big kind of gains, post competition gains in muscle after your contest. Well, if your hormone panel is shot pretty much, then you are probably not putting on a whole lot of muscle post-contest. So you do need to increase your fat on your body, but then over time you can kind of get back to, what I would call, normal progression and training and caloric intake.

DANNY LENNON:

Sure. So maybe to wrap this up, if we look to some practical implications, that even go beyond the scope of this paper, theoretically at least what strategies do you believe are most likely to mitigate these negative adaptations we see – or at least to whatever level they can be mitigated because of course they are still likely to happen? So what practices should be likely to give the most beneficial result both during a contest prep and then afterwards or on the flip side of that question, if you prefer, what practices should be avoided or maybe ones that are going to lead to sub-optimal results?

BRANDON ROBERTS:

I would start by saying being in a good place when you start your prep – if you are 25 to 30% body fat, maybe that's not a great starting point. Using longer contest prep – and this is reflected pretty well in the literature, 20 to 35 weeks, maybe 40 weeks to where you can drop bodyweight, maybe maintain your calories and your bodyweight for a little while, almost like diet breaks essentially – we don't have any research to show that diet breaks physiologically make a huge difference, psychologically they do – so I would say using some of those practices to kind of keep your training as good as you can, is a great idea. Then avoiding any kind of weird – and bodybuilders are again kind of known for some weird diet habits, but using almost like a flexible diet approach essentially to where you are taking in diverse nutrients, you are tracking well, and not overdoing the cardio too obviously.

DANNY LENNON:

Awesome. Brandon is there anything that is in this particular case study or a related issue that you would like to touch on or that we didn't get into that you think might be important before we move on?

BRANDON ROBERTS: I think that's pretty much it. It's a really cool case study. I really would like to see, and I say this, because I am writing a case study with two competitions, I think that would be a little bit more indicative of what bodybuilders try to do is get their Pro Card and then compete in the Pros in similar season.

DANNY LENNON: Awesome, yeah that would be interesting to see where that stuff goes, so it would be interesting to see that going forward. So with that we will turn our attention to the second research paper. So for those of you listening, this is a paper from September 2017 by Haun and colleagues titled Molecular Neuromuscular and recovery response to light versus heavy resistance exercise in young men. And again, we will put a link to this paper in the show notes to this episode. Brandon, before we get into this study first, over the last number of years, there's been a lot of discussion around this idea that potentially both heavy and light loads could induce similar hypertrophic adaptations if they are taken to failure or at least very close to that. Can you maybe set the scene for us Brandon before we get into this paper of giving us a kind of general overview of some of the, I suppose, hypothesized explanations behind this idea of how something that seems very different to people at the outset of very light or very heavy loads can induce similar changes?

BRANDON ROBERTS: Yeah, definitely. A few years ago, Stu Phillips published a paper showing 30% to – I think it was 90% – if you equate volume and use a same percentage 1 RM, you can get the same hypertrophic response. This kind of baffled people because – and if you look in the late strength & conditioning research, it's all kind of about increasing weight. So if you also bring in the meta-analyses done by Schoenfeld and Krieger, you know that volume is the main driver of hypertrophy. And I think this stems from the muscle protein synthesis aspect to where we want to elevate it to a certain extent but as long as we get that elevation, you know, there's a cap, right – it may not matter whether we do that with heavyweights or lightweights.

DANNY LENNON: With that in mind and if we take a look towards this Haun paper in particular, can you maybe give an outset of what they were looking to examine here and

what kind of, I suppose, question we were trying to answer with this particular type of study?

BRANDON ROBERTS: Yeah, definitely. So this is an acute study. So they are looking at kind of immediate molecular markers and then muscular markers that may differentiate between lighter trainings up to 30% and heavier training which is 80%, and this was a crossover design which was also kind of neat. They did like extensions, four sets to failure, they took a pre biopsy, a 15-minute post biopsy and a 90-minute post biopsy. So it's trying to pinpoint exactly what's happening on the RNA level, the protein level, in the muscle and trying to figure out is there a difference between heavy and light weights. Maybe we just don't have enough data to suggest that there is a difference long term, but maybe short term there is and that matters. So that's what the kind of purpose of this experiment was.

DANNY LENNON: Awesome. Before we turn to results, you mentioned that this was a crossover study – for maybe people who are unfamiliar can you maybe just give a brief explanation of why a researcher would choose to crossover the two groups, like what benefit would that give us as opposed to just simply looking at these two groups in isolation without that kind of crossover element?

BRANDON ROBERTS: Yeah, so, in a crossover study, you are basically your own control which highly reduces the number of people you need, which is a big deal and especially with exercise research we are asking people to give three muscle biopsies. So, it's a good comparison, as such that you don't need necessarily controls. And if you also think about it from more of a practical standpoint, we want to know how different exercises affect the same person – you know do I respond better to low reps or high reps? And so this kind of fills that gap and is a good use of kind of the study design I think.

DANNY LENNON: Awesome. Turning to some of the results – one thing maybe before we get to those – that you did mention was mRNA there. So when it comes down to this muscle mRNA expression can you maybe just explain the significance of muscle mRNA expression and how

that actually relates to or what it might tell us about adaptations to training?

BRANDON ROBERTS: Yeah, definitely. So RNA is kind of a response, so you have transcription and translation and to get these chronic adaptations you have to have a change first in transcription, and so mRNA is an output of transcription. Now, it's used as a surrogate marker, kind of like muscle protein synthesis but more upstream of that even, to say, hey, what's changing, are these genes kind of being expressed. And then you can go on to say, we know that mRNA has increased or decreased due to some kind of stimulus – does that hold at the protein level? So mRNA gets translated into protein and ribosome and that kind of gives us a good picture of what's happening inside the muscle.

DANNY LENNON: Perfect. So you said as part of this study they were doing four sets of these leg extensor exercises at either the 30% of the one rep max or 80% of one rep max. And then obviously vice versa in it when they crossed over the next time. What results did we see, what's the first few things that stick out when we look at the results of this particular study?

BRANDON ROBERTS: So, the first thing that kind of popped out – and it should make sense – is there was a lot more volume done – sorry, not volume, reps done at the low percent 1 RM which you know that kind of make sense. When you look at volume, they were not significantly or really practically different. So that tells me either one of these to failure, you probably get the same overall volume, which is kind of neat because you can choose what you want to do. The other thing that kind of popped at first is the EMG data – and this is not novel but it's good to see that muscle activation, so EMG is a measure of muscle activation – was higher in the 80% 1 RM versus the 30%, which may matter for strength.

DANNY LENNON: So, with those couple of things first I mentioned that the volume was pretty much the same, although obviously total reps is going to be different than for the lighter load, and that we have these differences in EMG. What are the main implications for those few findings for practice or at least what things could we take from those to maybe ask some further questions?

BRANDON ROBERTS: So, with the reps, and I will kind of focus on that at first, because I think that's the most practical, you have people – as a coach you see where people love high reps or hate them or maybe they love a medium rep range or low rep range. And this is kind of a traditional 80% intensity is a normal rep range, maybe 8 to 12 or 6 to 12 or something like that; and then when you look at the 30% you are doing a lot more reps, and most people don't want to count that. But some of my kind of female physique athletes, they do like hitting 30 reps, they just think it feels better, so practically, if you can get the same volume, and ultimately – not in this paper, but other papers show the same hypertrophic response, you can kind of pick your rep ranges a little bit.

DANNY LENNON: So, do you think then – and I think there's actually been another recent paper that's kind of alluded to this benefit of maybe self selecting set and reps schemes. I can't remember the author's name, but maybe that kind of lends credence to the same thing. If we, rather than prescribe specific numbers of sets and reps, do you think that it's a viable strategy maybe for coaches to start prescribing volume loads for clients to hit and give them a range of set and reps schemes that they can use to calculate that or to hit that prescribed volume load with the results likely being similar?

BRANDON ROBERTS: Yeah. I think a lot of coaches already do a somewhat of an intake of this. You will see kind of volume calculations. I know in my sheets that I use I have them. So you can see volume hopefully progresses across time, but you can, like I said, use a range of reps which does allow a little bit more practicality. And I think the author of that paper you mentioned was Borg I think and it did show – if you do stuff you like, you get better at it.

DANNY LENNON: Right. Yeah. So again, maybe we will revisit that in a moment when we talk about more implications for this. I do want to pull back to, we mentioned earlier mRNA expression, what do we see in the results here and what can we take from that?

BRANDON ROBERTS: If we look at – there's quite a bit of mRNA, so I will just hit the ones that I think are the most important. Muscle protein breakdown, and that's not usually measured kind of in comparison to muscle protein synthesis, so we look at the mRNA measures of that are Atrogin-1 and MuRF1, they are very traditional. And we don't really see a big difference in muscle protein breakdown, which is good, or – and moving onto the next kind of set or class – or an inflammation markers, so IL-6 and TNF alpha are classical information signaling markers. So at the kind of response level of mRNA, kind of the inflammatory degradation response, it's not really different. Now, when we look across everything else, nothing else really sticks out, except for myostatin mRNA which is decreased – so myostatin is an inhibitor of hypertrophy, it's decreased more at the 80% 1 RM compared to 30%. So that could say maybe over time that matters. I don't know that in the study it's super important, but it is one of the more hypertrophic response mRNA data points that I liked.

DANNY LENNON: Sure. Another thing that they set out to look out was the recovery response. Was there any difference that we saw in this particular comparison?

BRANDON ROBERTS: Yeah. So, the light group, so the 30% 1RM group didn't recover as far as performance compared to the high intensity group, and this was shown in kind of peak torque. So if you think of light extension kind of and torque you can measure it at different speeds, so there's like 30 degrees, 60 degrees, 180 degrees, etc. So for some reason – and they did speculate on this a little bit – there's a differential kind of negative peak torque response in the lighter group. But when you look mechanistically at myoglobin and then practically at – they call it algometry, so it's kind of a pressure DOMS type sensor – there wasn't really any difference. So maybe performance wise, it does make a difference at the 48-hour mark at least, maybe before or after it may not be as important.

DANNY LENNON: With that and these kind of few implications we discussed, are there any major drawbacks or limitations to this particular study that may give us pause for or just be a bit cautious about trying to

interpret what they may mean or may tell us for practice?

BRANDON ROBERTS: Yeah, so the other nice thing – and I don't think there's any major limitations, I think this mainly just adds to the literature, but it would be nice to see maybe a range where we have kind of an intermediate, so 30%, 80% is pretty extreme of a difference. You are probably not going to do in practical application 30% of 1 RM but mechanistically it's a good comparison. So you see a little bit of this in the literature. I mean, there's like a 15 or 75%, but overall I think for what they had with the subjects, and what the kind of tissue allotment that they had – because again, there was three muscle biopsies and that's a lot of – good little chunk of tissue – they did pretty well.

DANNY LENNON: One thing I would be interested to ask about is the level of the participants here, so I think when they classify them as resistance trained in this study it was they had to be completing three or more days per week of resistance training for at least six months or more, in order for them to be classified as resistance trained. So, with that, while it does give us better than having untrained subjects, it's not an extremely high level. So if we consider that work trying to compare something of using a lighter percentage of 1 rep versus this heavier one, particularly how that maybe affects recovery – if we take someone who's extremely highly trained and maybe kind of more elite level, strong, where the absolute loads they are handling are so extremely high, could that maybe have a different interference of what happens with these heavier or percentage wise heavy resistance training bouts in that while relatively compared to these less well-trained individuals, it might be the same relative weight just because it just so much they may have differences in how they actually respond and/or recover?

BRANDON ROBERTS: Yeah, so, if you think about – and I will use powerlifter as an example here – if you think about powerlifters and elite powerlifters lift really heavy weights, and there's a toll that occurs on the central nervous system outside of kind of the muscular response that you have to account for in recovery. So when you have powerlifters squatting 5 or 600

pounds, and that's maybe 85% 1 RM, that's a lot different than someone squatting 200 pounds and that they are kind of 80 to 90% 1 RM. So I think that's something to consider definitely, and I would – actually something kind of reminded me, was that if you think about this kind of population – like you said six months trained, they are probably not exercising at 30% of 1 RM, so that could contribute to the kind of fatigue and differential response in torque that we see. Because most people aren't – even if you are training for just six months you are probably not using 30% 1 RM, you are probably using something higher, like an 80%.

DANNY LENNON: Right. So purely the novelty of doing that is going to lead to that greater fatigue and change.

BRANDON ROBERTS: Yeah, exactly.

DANNY LENNON: Awesome. In terms of some next research questions in this kind of field to be answered, what do you think are kind of the next kind of logical steps to try and examine in the literature or what research questions you'd be most excited to see looked at in this particular field over the next couple of years?

BRANDON ROBERTS: So I think now that we've kind of classified the untrained response and the trained response, like you mentioned a second ago, we care, especially us, we care about the higher level athletes and how they respond, and if that's different – because if it is different, it matters a lot. Now, I hesitate with interpretation of acute studies because they are surrogates, so you look at all these measures and you are like, okay, well, acutely this changes – but how does that matter or why does it matter in the long run? Because ultimately I care about either getting stronger or putting on more muscle or both presumably. So I would like to see bigger – and this is kind of a pie in the sky type thing, bigger studies, so more people, more time points and maybe a global analysis. We are doing some RNA sequencing now that sequences like 100,000 genes, and I think that approach is kind of where the next step is and I am sure somebody is probably working on that already.

Brandon Roberts

DANNY LENNON: Before we get to the final question Brandon, maybe just let people know if they are interested in finding out more about your work, about your background or where they can contact you online or on social media, all that type of stuff. Where's the best place for them to go on the internet?

BRANDON ROBERTS: So, Facebook is probably the best, and it's just – I think if you just look up Brandon Roberts – I have a little bit on Twitter, so that's more of my like skeletal muscle people on Twitter, there's a good little cohort of people. And then my writing is usually on either SCI-FIT but I have a website, fitnessandphysiology.com where I have a list of all of my writing across the web, and it's pretty scattered. And then of course ResearchGate – I just updated that yesterday. So those are some places you could probably find me.

DANNY LENNON: And so for everyone listening, I will of course link to all of that in the show notes for you to go and check out. And with that Brandon, first, before I finish, let me say thank you so much for taking the time out to do this and to go through these two particular papers and give us a bit more insight into what goes into these and what some of these measures mean and what that might mean for practical or people in practice. So with that we will get to the final question that we always end the podcast on. And this can be to do with any topic completely outside of what we discussed. And it's simply, if you could advise people to do one thing each day that would have some positive impact on any area of their life, what would that one thing be?

BRANDON ROBERTS: I would say to try and fail at something. Maybe not something big, because then you get discouraged, but have some type of challenge where you don't know if you can actually complete maybe a task or something like that. That's what I would probably say.

DANNY LENNON: Brilliant. With that we will wrap it up there. Brandon thank you so much for your time and information. It's been a pleasure chatting to you today my man.

BRANDON ROBERTS: All right Danny, thanks for having me on, I really appreciate it.

Brandon Roberts

Do you enjoy these transcripts?

If so, please consider showing your support on Patreon:

[Patreon.com/sigmanutrition](https://www.patreon.com/sigmanutrition)