Stuart Phillips (April 2020 Live Q&A)

Lawrence: Hello everyone! Welcome to the April 2020 Live Q&A within HIT Business Membership, really appreciate all of you joining today. Just so most of you are aware we obviously do this every single month inside HIT Business Membership, and we tend to alternate between exercise and business. Sometimes you might have exercise or business two months in a row, but typically we won't have more than two in a row on the specific one of those categories. We tend to try and get as much exercise and business covered throughout the year. We've had people like Dr. Doug McGuff, with Dr. James Fisher, and obviously the business stuff with people like Luke Carlson and Blair Wilson.

Today, we are very lucky to have Dr. Stuart Phillips on the call, who is obviously an expert in everything related to research around nutrition, exercise, around muscle and muscle protein turnover. A bit more intro on Dr. Stuart Phillips, he is an award-winning professor at McMaster University's Department of Kinesiology. He is the Director of the Physical Activity Centre of Excellence (PACE) and the McMaster Centre for Nutrition, Exercise, and Health Research, and a Tier 1 Canada Research Chair in Skeletal Muscle Health. He is one of the most sought after and well-respected researchers on the impact of nutrition and exercise on muscle and muscle protein turnover, and has featured multiple times on the High Intensity Business podcast.

Dr. Stuart Phillips, thank you so much for participating today, I really appreciate it.

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Stuart: It's my pleasure to be here, Lawrence. Thanks for having me.

Lawrence: Awesome. Just, I guess, a few things before we get started. Many of you would know this. But if you have a question, please raise a hand on the control panel and I'll unmute you and you will be able to ask Stuart any question that you like as long as it is appropriate. And if you have any audio issues then please type the questions in the box and be as clear as you possibly can, and I will actually read that to Stuart during the Q&A. We might ask follow up question for refinement and each person can have 2-3 questions that's absolutely fine. This will be recorded for future reference, so bear that in mind, don't say anything you don't want people to listen back to. But just bear mind this is a private community, it is not being posted publicly.

One last thing I want to mention, Stuart, is I appreciate you taking the time away from posting what have been some priceless thoughts and great humor on Facebook feed lately about COVID-19, diet, and all these good things. I appreciate that.

Stuart: You are welcome. I'm not sure everybody agrees with me but trying to keep it real, trying to keep it science. That's all.

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Lawrence: Fair enough, yeah. No, I appreciate it. I think we all do. Great, okay, so let's get started. I've got a hand raised here a question from Joel. Spare me a second.

Here we go, usually takes a moment... I might have to change to Zoom at some point, GoToWebinar is letting me down.

Oh, there you go. Joel, are you there? Hey, Joel, what's up? Can you hear me? I can see your comment raise hand but you should be on the line now. Okay, I'm going to try Craig. Try and see if you can fix your situation on your side. I'm going to mute you for a second. Raise your hand again in a moment or ask the question in the box.

In the meantime, I'm just going to unmute Craig. There you go. Hey, Craig.

Craig: Hey, Lawrence, how are you?

Lawrence: I'm good. How are you?

Craig: I'm good. Hope you guys are well.

Lawrence: Very good. Throw it away, good.

Craig: Okay, so listen, how are you doing Dr. Phillips?

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Stuart: I'm doing well. Thanks, Craig. You as well?

Craig: Doing really well. Thank you. I'm actually hanging out in my empty gym here doing the webinar.

Stuart: You have an empty gym. You are the envy of a lot of people.

Craig: Yeah, I just come in and play, that's pretty much [unclear – 4:31] Just a quick question in regards to protein synthesis in aging populations and in terms of strategies to maybe improve it, and if it's merely a question of an aging population that is sedentary and that's just the metabolic effects that come with the inactivity and the loss of muscle mass being sort of the prime reason for it, or if that decreases just simply genetic and biological and just comes with time relevant to your strategies.

Stuart: Yeah, great question. I mean, I think my take on it is that there is a program of aging that all cells undergo, no matter whether you are an earthworm all the way up to humans, that you can't really fight. All you can do is maximize your chances. Then there are disease processes, chronic diseases, that begin to impinge upon that. I'd think from cardiovascular disease, diabetes, you name it that probably accelerate the aging process or cause a portion of some physiological process to break down.

In combination with that, and I think if you look again all the way from very primitive multi-celled organisms all the way up to humans, everything as it

ages slows down. It does last. It moves last. So that's a normal part of aging. You can obviously combat that by trying to stay as active as you can, but even in the top of the top, and so could be ultra-endurance athletes or so called 'Blue zones' around the world, people are just maximizing their chances there to live a longer life. So it's probably a combination of biology, genetics, and aging program that's ultimately is inevitable that's being sort of modified or tuned along the way by chronic diseases. And then you contribute to it by probably being more inactive rather than more active as we age, but that also goes hand in hand with aging. But, you know, exercise I would say hands down is probably the most effective way to combat that and if not extend lifespan which a lot of people are studying.

I have no issues with longevity research, but I think it's the quality of that you enjoy over the quantity that a lot of people are more interested in. There is a famous researcher at the Mayo Clinic named James Kirkland who came and gave a talk. I'll never forget the line he uses that nobody wants to grow to be 120 and feel like they are 120. That's maybe trite to say, but who wants to suffer with all of the issues of a 120-year old if you are 120. I'll take whatever life gives me, try to live it to the fullest and the best quality I have, and obviously for as long as I can, but aging is going to get you at some point.

Craig: Okay, perfect. And then, just a quick follow up, in terms of recommendations for protein intake generally speaking for an aging

population. Does it stay in terms of recommendations or should it increase over time?

Stuart: Yeah. This is something that… It's a great question. Honestly, I've been having some terrific back and forth on Twitter and a few emails with people that probably have a different view than me with respect to aging, and protein intake and the fact that higher protein intake shortens life span. I think that that evidence is difficult to argue with from again a primitive cellular organism stand point. Particularly, the scale up to organisms that began to closely recapitulate ourselves is pretty difficult, and that's where I struggle.

My take is that, and even the famed anti-protein, if you want to call him that, Valter Longo, his work even suggest that older people do better with higher protein intakes. Now, where that number lies is a matter of debate. Now I see a minimum protein intake for an older person sitting at 1.2g per kilo, not 0.8g, and I think benefits can go up from there. But a lot of my conclusions are couched against the background of being physically active so I'll definitely admit to that. Look for more on this. We've got some good data we think coming out pretty soon.

Craig: Okay, cool. Thank you very much.

Stuart: My pleasure. Thanks, Craig.

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Lawrence: Great questions, Craig. Great way to get started. Just going to mute you there. Alright, Joel, we'll try you again and see how it goes.

Joel: Hello, Lawrence.

Lawrence: Hey. Oh there you go. How are you doing?

Joel: All right. I'm doing good. Thank you for trying me a second chance.

Lawrence: Of course.

Joel: Alright, so… Hey, Stu, first of all I do want to say thank you for your post on the Twitter as Lawrence mentioned. It's been kind of cool to see someone else kind of are like minded and I enjoyed your tweets.

Stuart: My pleasure, Joel.

Joel: I'm going to start off. I have a couple of questions if that's okay and if not, Lawrence, you can just interrupt me.

Lawrence: Sure.

Joel: I'll start off with I have some clients that maybe don't like whey protein, the taste of it, or trying to avoid animal proteins. For those clients I will usually have them add some leucine to their protein supplements just to

kind of get them beyond that leucine threshold. My question is, is there any difference once you've added some leucine in there to reach threshold of protein quality or does that pretty much equate like a vegan protein too like a way?

Stuart: Yeah, it's a good question. Look, I mean, I think… I'll be honest in saying that for a lot of years we studied animal derived proteins, and so a lot of research to do with whey and casein. Some worked to do with soy. I think a lot of people sort of or in the opinion that I'm anti soy or anti plant protein, and nothing could be further from the truth. But I'll be honest in saying that the grants that we got to study this first came from people like the U.S. National Dairy Council. So full disclosure, we've had money from them and it's been dairy based proteins.

There is no doubt that from a protein quality standpoint dairy based proteins are the highest quality. I understand maybe from a person ethics, or a taste profile, or some people don't tolerate diary proteins particularly well there are reasons to choose other proteins. Soy is a good choice. We've just published some work, just yesterday that came out on potato protein. And I know a lot of people like say, "What do you mean protein from potato?"

Joel: I saw that. I didn't get a chance to read it yet but I saw that.

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Stuart: Yeah. I mean, potato protein, pea protein; a lot of these proteins are pretty high quality. They'll do the job. They are lower in leucine. And so to your point about sort of adding that leucine spike if you like to regular meals, it will be equivalent of adding a little bit of leucine back to lower quality proteins. And work from Luc van Loon's lab has definitely shown that proteins like wheat protein, for example, can be made to be better from a muscle perspective by adding leucine to it. The story is the same for a lot of other lower quality proteins or lower doses of protein.

I think the important point to just sort of bear in mind too is that you've still got to have all of the other essential amino acids there as the supporting cast. Leucine to me is like turning the lights on, and then the rest of the amino acids, once that process has been switched on they simply fit in as building blocks. So your approach, not a bad approach by any stretch. Leucine is not the best tasting amino acid. I will say that. I mean it's super bitter. So we've work on a few sort of small, kind of modular leucine type delivery systems that hopefully you'll see in the next, well, who knows, let's say hopefully in 2020.

Do exactly what you suggest. In other words, getting the leucine up is really the key and then the rest of the protein is able to do its job a little bit better. So not a bad approach. I got to be honest if you said to me, sprinkle some leucine on this, I'd be like, okay. But the taste profile usually makes me wrinkle my nose a little bit.

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Joel: Cool, cool. No, I haven't actually had anyone object to it as far as the taste goes.

Stuart: Well, that's a good test right there. Food scientists will, you know, as long as people can tolerate it, then you are good to go.

Joel: Cool. Okay, now, I have a couple of questions about exercise. In our camp of high intensity strength training, one of the things that we talk about a lot is taking sets to on rep and then probably decreasing the frequency that you may be exercising. You say that might be around two times a week or something like that. My question is… I have two questions but the first one is about frequency. How important is frequency? And if you are looking for hypertrophy, if you are only working out maybe once or twice a week, are you losing some percentage of the potential gains because you're just not lifting heavy things frequently enough?

Stuart: Yeah. My reply to this is going to be a little bit pragmatic. I'll be honest that there might be some, not might be, there is definitely some cognitive bias going on in this in that my research becomes mesearch, right. In other words, I use myself as the example for this. But I'm going to rely on published data. Brad Schoenfeld has done a huge service and Jozo Grgic is also one of a lot of these meta-analysis looking at the factors that play important roles in determining hypertrophy and to some degree strength gains as well. I think one of the things that we are beginning to see emerge is that the frequency of sessions per week can be made up for by

the volume of work that you do within a given session. If you are able to tolerate it, and by tolerate I mean there is no sort of the next day you can't move, and you're so sore, and your joints are you know. So that's the mesearch part of thing, and so the older I get, the more I've been averse to doing higher volumes and heavier weights.

Full disclosure, Tuesday, whatever it is. I lose track of the days during this… Full disclosure, Tuesday, that's been my take. One of the things that we aim at now is to try and get a prescription for resistance exercise that is just palpable to as many people as we can. So you get people who are… they are buying in. They are definitely onboard. And so these volumes and they are probably, well maybe not all of them, but some of them younger than me and they are like bring it on. I trained a lot of people over the years, and before I got into science found that some people could tolerate a ton of stuff. I don't think you are sacrificing anything is the short answer. I think that within the range of clients that probably train, there are people who can handle more and do more and will probably welcome it. I don't know that it will give them more growth. But if they are into it and they can tolerate it, then bring it on.

I do think that there are groups of people and particularly as people get a little bit older who would want that to kind of back off. I flirted with things, various forms of HIT, and I've done CrossFit, and I know what kind of works for me and what doesn't work for me. But I'm not so wrapped up in my experience to realize that other people have different levels of

tolerance. That was a long answer. The short answer is I don't think you're giving up much if you equate volume of lifts across the week to be honest with you. Twice we'd squeeze to use my analogy, a lot of water out of the rag. You know what I mean.

Joel: Yeah. I know, that's perfect. Perfect. You mentioned that you've tried HIT, you've tried CrossFit, I'm just curious what have you landed on of what works for you? I'm just asking for you, not for the benefit of everybody.

Stuart: Sure. I'm in the gym. Even now my basement has become my gym. I'm in the gym doing something probably 5-6 days a week. I generally take one weekend day off. It's usually Saturday, sometimes it's Sunday. And I try and just do something. I'm a big believer that a little bit of movement goes a long way. Every day is not a super quality workout. I don't take a lot of pre-workout supplements. Particularly caffeine fire me up. If there's a day where I've got low energy, I just accept that it's a light workout or maybe some stretching and everything. What I've sort of figured is that I tolerate very well two workouts a week. Three I can do for a certain period of time and then after that I have to back off. But I can do two workouts a week and I could probably do that until they nailed the casket shut.

I'm a big believer with my colleague Martin Gibala with the HIT work that he's done. I try and get at least one quality high intensity aerobic session where I push my heart rate in a variety of intervals to as close to max as possible. It's an unpleasant experience during but I reap the dividends after. On other days, I'll be honest, I probably filler workouts to just get me

moving and to get my head squared around, and to make me feel good, and a whole lot of other stuff. But, you know, that's what works for me. There are a lot of other people I know could do a lot more and some that were probably beg for a lot less.

Joel: Yeah, exactly. I think those feelings that you mentioned there it is what we're all trying to go for and achieve. I have one last question if I may, Lawrence?

Stuart: Absolutely.

Lawrence: Go for it.

Joel: It's actually related to… It just kind of pop up when you were talking on my previous question, so the idea of muscle failure. I guess my question is, is muscle failure necessary? And then, is it beneficial? We are talking about frequency, and this is where I'm kind of, these are playing together now. If I go to muscle failure that may mean my exercises are less frequent because it's going to take me longer to recover. So my question is, is it better to go for a muscle failure or if you are able to get in one more workout is that better? And maybe we answered the questions already in a way with the last one, but…

Stuart: It's a great question. I mean, I think that people, it's been interesting to see where a lot of other people have gone with… I'd like to say that we were

the people that introduce it but that's not true. I'm going to take you back to the lighter weight paradigm when we first did it and we had people lifting at 30% and people lifting at 90%, and it was just a mechanistic study. And people were like, "Oh, that is just a mechanism." And then we did a training study but it was unilateral and people said, "Oh, well, that is just unilateral." And then we did a cross sectional study and people said… You could on YouTube and find the video where they just basically torture our study and rip it apart for an hour. It's good, it's great theater. I won't mention names, but I mean, the bottom line is… and it's as if we invented something and that's not true. We just opened up again a paradigm that's a little bit different from what was being taught at that time. We used lighter weights and going to failure like absolute screaming, "My god, this is a 10/10", or to use the analogy, "This is an 11. It's an 11." We've gone passed if all of the Spinal Tap fans know what I'm saying there. It hurts. It's not pleasant and lifting lower weights to that type of level of fatigue is kind of sucks. It doesn't kind of, it just sucks. We did it in the lab, and then everybody thought…

Joel: That's brutal.

Stuart: Yeah, everybody thought there was something magic about 30%. And I said, that's not true. It's a rep range and all we were saying is don't say that this is the range to develop hypertrophy when actually a lot of ranges develop hypertrophy as long as you go to fatigue. Now, I get it, there is a lower threshold probably around 20%. Don't go below that or it's not

hypertrophy developing, it's endurance. Up and above that there are rep ranges and all kinds of things, it's failure necessary in the lab, yes.

I posted everywhere at our gym at PACE where the average age of a member is probably close to about 73, 74, are [unclear – 24:10] that are from 0-10 and are color coded. We don't talk about percent 1RM. We just tell people to lift and work until you get into the yellow or orange range. In other words, 10/10 is the red, like, I'm dying. And nobody needs to come in and work out there needs to. Would it be good? Yeah, every now and again, why not. But is it necessary? I guess it depends on your goals. There's not too many people in that program who are looking to break Olympic records. But if you are looking to break Olympic records then why would you not have a training session where you try to work for 10/10. So it's goal dependent. I don't think it is necessary.

But like I said before, and it's an analogy that work so well, is to dip the rag in a glass of water to squeeze it hard and see how much water comes out. That's workout #1. And then squeeze it harder and that's workout #2. Squeeze it even harder-er and that's worout #3. But what you see coming back from the rag is progressively less and less. You know what, I get it. If you need that last drop because you want to climb on the podium or you want to place first in the bodybuilding competition then go for it, man.

Joel: That's cool. I like that analogy.

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Stuart: It's one that's work for me for quite a while now. And everybody says, "You stole that from somebody else." And I'm like, "Honestly, if I did I'd correctly attribute them, but I think I came up with that." I'm not sure. Maybe somebody probably did it before me. It's like Arthur Jones probably did it 40 years ago. Maybe I heard it and then made it mine. It's one that I think people can visualize and then the perception of effort taken to bring more water out of the cloth is one that we've all had a little bit of experience with.

Joel: For sure, for sure. Alright. Well, hey, thank you very much and can't wait to hear what all other questions they got here. Go on.

Stuart: Yeah, my pleasure, man.

Lawrence: Of course. Joel, I'll mute you, but if you got more let me know.

Joel: Perfect. Thanks.

Lawrence: Okay. Richard, spare me a second. Richard, can you hear me? It's probably going to take a moment. Hey, Richard, how is it going?

Richard: I'm wonderful. How about yourself?

Lawrence: Very good, thank you. The floor is yours.

Stuart Phillips (April 2020 Live Q&A)

Richard: First of all, thank you both for taking the time to do this today. I really appreciate. I have two quick questions. One of them is sort of a little bit along the lines of the last gentleman in terms of protein turnover; and this does fall into splitting hairs, being a geek, you said about, if you are trying to go for an Olympic record or stand on the podium. But a lot of us is like what can we do to get the absolute best results as opposed to just doing pretty good. My question is more along the lines of just my thinking, and please find fault in my thinking pattern because this is mesearch for sure, and that is, when we look at frequency it's about managing a limited resource i.e. recovery ability. But what I've sought, and this is also Ryan Johnson came up with this a long time ago, is if a person rather than workout at a certain frequency with so much time between each workout, which is kind of a linear way of looking at it, if instead let's say I work out every day; because I find using my InBody Body Composition tool that I often get really good readings the day right after your workout. So my thinking is, if a person works out every day, and I did so for a period of time, and then when they realized because you would soon get to a point of overtraining, and then at that point maybe you take 2 or 3 weeks off altogether, whatever the interval is, just to make a point here. And then went back to doing that daily. In other words, you push yourself into that level of overtraining when you realized that is what's happening, take a longer lay off rather than layoffs between every workout. Wondering whether that actually could be more effective than just a linear approach of so much time between each workout?

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Stuart: Well, Richard, I'm going to rewind and say, first off, there is nothing wrong with, I say these are my goals that I'm sort of imposing on top of this. But you may not stand on a podium, you may not get your picture on the cover of Muscle & Fitness, but everybody has a goal that they are trying to meet, so you want to achieve that. You said I think it was sort of a mesearch but taken to the nth degree or ultimate nerdiness, I forget your phrase, but I totally get that. I've had periods in my life where I've done sort of self-experiments to try push my own limits, right. It's not that I'm not engaging in those now. I do but they are just a little bit different than they were a few years ago. But lots of people are doing that sort of thing.

I think the phenomenon you're describing, and you can probably give it a lot of names, but greasing the grove is one of the things that's come up. Basically, sort of persistently practicing and just doing a little bit of work and your InBody results probable bare out the fact that the more work you do, the more energy you'll expend generally gives you a more favorable body composition. That's my guess and I could be way off there. But if you believe calories in, calories out, and hand on heart, and full confession Tuesday, I do. You can twist a few thermodynamic laws but you can't really twist them that. They'll squeal a little bit but not too bad.

Really, your approach is one that… Again, it sorts of comes down to personal preference. The ability to tolerate these sort of things. It sounds to me like you've been smart about it and inserted what I call appropriate periods of the usually neglected or often forgotten variable which is the

workout is great but it sets the table. You know, the eating, to use the word literally and the good stuff happens in recovery. Under recovering or overtraining, there's probably people who would tell me there is a subtle difference, but they are two ends of the same of the same concept is the key I think. So allowing yourself the appropriate time to reap the benefits of your overtraining/overreaching/whatever you want to call it phase and higher volume phase. I mean, this is obviously you begin to slide into periodization and though I'm not a fan of that term.

You know, last year in Toronto when the Raptors won the NBA Championship, people talked about the great job that the team doctor had done with load management of Kawhi Leonard. To me, load management, great name. Periodization another great name. Simply for when he was tired we let him rest. When he told us he was hurting we let him rest. When he wasn't or when he said, "You know what, I'm going to ignore the pain and push through it.", we let him go. And we saved him, and saved his energy, and his best play for the Playoffs. You can call that load management or periodization but that's just resting appropriately in my vernacular. But it sounds like you've got it figured out and I have no issues with that approach at all.

Richard: My second quick question is the used of enzymes. I'm 61 years old and it's been suggested to me. I can't remember the name of the enzyme. I know I'm taking it, but probably doesn't matter because you would either recommend one or not recommend them at all. For a 61-year old where

protein absorption seems to be not as good it is to take certain enzymes with your protein. Particularly, the first protein of the day, if I understand correctly. Are there benefits to that? Does that make sense to do that? That's what I've been doing lately.

Stuart: The work that I've seen, and it's not our work, and I'll be honest with that is that if you'll look at the work from a guy named Luc van Loon who is in the Netherlands. He's done a lot of work in this area. A guy named [unclear – 33:42], who is also a Dutchman but is now down at Texas A&M, suggests that there is a decline in the ability to digest and absorb protein for older people. But my take is relatively small. It's probably not as big a deal that you couldn't make up for that by consuming just a little bit more protein.

I'm generally not a fan of trying to use enzymes as an aid in digestion. Unless, you are a bona fide you have a deficiency, you know, lactose malabsorption. The deficiency of lactase is the easiest example so you take a lactaid pill which contains the enzyme. But I've yet to see unless somebody has a true pancreatic condition. Data showing that people who take these enzymes that it actually even increases the absorption of the amino acids. Now, in clinically deficient states there are data, but in people like yourself, and unless you have a clinical condition I think that you are probably… Again, to come back to the water out of the cloth, you're getting maybe the last drop but you have gotten the majority of it on the first two squeezes is my take.

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Richard: Okay. Well, I mean, a lot of these questions obviously are hairsplitting but that's part of being a geek I guess on this total thing. It's all fun to talk about. Thank you very much for your rebuts.

Stuart: My pleasure, Richard. Let me just say again that there is nothing wrong with being a geek. That's what I do day in and day out, and I feel very good about myself.

Lawrence: Alright. Awesome. You might be interested to know, Stuart, Dr. James Fisher is also on the call as well. He is mostly just listening.

Stuart: Well, I understand that you'll let anybody into this call. I get it. It's all good.

Lawrence: Exactly, yeah. But he has talked a question, well he didn't talk a question, but he… You talked about your potato protein research recently which is fairly new. He mentioned to ask you to talk about that. I knew you've spoken about that a little bit already but I'd love for you to speak on that – what were the outcomes, what did you find about potato protein supplementation, how does it compare to other forms of protein etc.

Stuart: Thanks by the way. It's good that James is on the call. We've actually been doing, probably people have seen it flying around social media, some fantastic work with the two James-es of Solent over there with the questionnaire about how this pandemic is affecting people's training

practices. I'd just a side bar here want to say that that's the part of science that I truly love. You know, collaboration and particularly wide flung international collaboration. That is the secret sauce of what makes science so great. It's always really been a pleasure to work with those guys over there.

Back to the question. I mean, I think…

Lawrence: I'll see if I can get that in the show notes, the questionnaire. I did it myself. Well, it's a great questionnaire and great survey but it got a bit personal places for me. I gave all my information anyway because I'm guessing it's anonymous. Go on.

Stuart: Full disclosure Tuesday, I mean, Fisher and Steele came up with it so if you have any issues or you wish to file a class action lawsuit. Feel free. Solent University, Southampton is open for business. No, I'm kidding though.

Lawrence: That is fine. It just surprised me.

Stuart: Yeah. There are some personal questions and obviously everybody has the right to refuse to answer. But, yeah, if you can get the link out that will be awesome.

Stuart Phillips (April 2020 Live Q&A)

Back to the question, sorry. So potato protein and I think the dichotomy that we sort of have and… I mean, I've talked about it in a lot of the papers that we've written, right. It's that plant based proteins are lower quality. They are sometimes lower in essential amino acids. They tend to be lower again in leucine. And dairy proteins and animal based proteins tend to be higher quality. Once you take a plant based protein like pea, or potato, or rice, or like lots of other proteins and you isolate it, so you take it away from the anti-nutritional compounds like fiber, and phytates, and things that inhibit enzymes to break down protein, then a lot of these isolated proteins become much more even then it's driven entirely by the leucine and essential amino acids content of the protein as to its effect. So the potato protein point was to take isolated potato protein and again, side note, it's gritty. It's got an earthy taste. We're not food chemist so we just stir this stuff into a pudding a cup. I think everybody on that side of the Atlantic knows what pudding is, just sort of ours was chocolate flavored, like mousse I guess to disguise the test. And then other people just got a plain old pudding cup. In that sense then people to check for the blinding at the end couldn't really tell the difference. There was a grittier texture and a few people guessed right, but as many people guessed right is guessed wrong, so we think we did a pretty good job.

We tested it in young women. We gave them a standard diet to start, we checked their muscle protein synthesis, then we gave them more protein as potato and their muscle protein synthesis went up. I hasten to add that it was the RDA for protein at the beginning and twice the RDA with the

potato protein. The placebo group stayed the same. The muscle protein synthetic rate went up when we fed them twice the RDA. Basically means that the RDA is not sufficient. We've shown that a number of ways. I'm probably tired of telling people that but it's a message that we keep trying to hammer on. But it's like the RDA came down from the mountain that was presented on a tablet and "Thou shall not question the RDA" It will probably never change to be honest with you. Sorry, go ahead.

Lawrence: I was just going to say seems the RDA is inaccurate across a number of different properties in food from what I've seen.

Stuart: Yeah. Again, another article that I'm co-writing with a group of probably about 8 or 9 other scientists in Canada, we are discussing that very thing. I just think that people have to be aware that there are issues of lower protein quality with vegetarian diets. But those are whole foods, you probably need to consume a little bit more and the RDA is probably not sufficient for somebody who is a vegan vegetarian.

Now, having said all of that in the study, the other thing that we did was have these young women, and we deliberately chose young women because they are relatively understudied population, and we have them exercise one of their legs. People don't like it but it's a very convenient and easy way to look at the effect of the exercise within the same group without having to recruit another group that does the exercise alone. So you save money, it produces biological variability which is much higher

between people than within a person between legs. What we found was that everybody's muscle protein synthetic rate went up. The potato protein actually didn't have an advantage. A lot of people disappointed in that say, "Look, there's really the fact potato protein does nothing." But the effect of protein is relatively small and we've shown that several times. A lot of other groups have shown that. It's hard to pick up. That's really I think the key thing remembering that that's a between group difference rather than a within group difference. Everybody's exercised leg did better than their non-exercised leg. But the added protein actually didn't augment it. So potato protein, high quality, higher than we thought and definitely able to support muscle protein synthesis, but not a great stimulator of it over and above exercise. But that's consistent with a few other studies out there.

Lawrence: Just last question related to this and then I'll open the floor for Joel and Richard. I think they've got more questions. What would be in your view the best source of protein? The highest quality source with the best range of amino acids in any whole food?

Stuart: Yeah, I mean, diary proteins. There is no equivocation about that. They have the highest essential amino acid content. They are the most easily digested and absorbed. If you have them as milk proteins so you get the whey and the casein in together, and I'm talking about milk that comes from cows in this case, but you could do human breastmilk if you wanted to. It is easily supportive of the time in our lives at which we were growing at the greatest rate, so as an infant being breast fed or formula fed,

whatever. I mean formula has tried to copy breastmilk. That's the pattern that they try to emulate and that's because it supports growth. There is no or buts about that. You can come close, soy is probably the best plant based, the runner up.

Lawrence: What about like steak?

Stuart: Yeah. Well, I mean, steak is a good source of protein.

Lawrence: But not as good as dairy?

Stuart: Not quite. No. It's got a few essential amino acids that are a little bit lower. But again, these are subtleties that probably in the long run if you just eat a bit more steak are completely washed out by eating more. I mean, it's not a mystery as to how you… And there are bunch of studies out there showing people supplementing with rice protein, or pea protein, and saying, "Look, it's as good as whey." And it is when you consume enough of it. So if you eat enough everything becomes a wash, right.

Lawrence: Cool, I appreciate that. Joel, I think you may have another question so I'm going to unmute you. Hey, can you hear me?

Joel: Yes, thanks. Yes, I think I'm back.

Lawrence: Yeah, you're back.

Stuart Phillips (April 2020 Live Q&A)

Joel: I had a brilliant question which I forgot as we got caught up into the conversation there.

Stuart: That's fine, Joel. The way to overcome that, for me, I have a pad of paper and a pen by my bed side because my wife tells me that… I'm not the greatest sleeper. Sometimes I wake up, again, full disclosure, I have like great idea for something or have something that's bugging me I find if I write it down right away it actually takes care of a lot of it. Not to say that it increases I've gotten older but it has increase as I've gotten older so you know.

Joel: Yes, for sure I'm in the stand.

Stuart: Not that you are older. Just a story.

Joel: Yeah, I think I maybe a little bit older. I think we are close. Well, hey, speaking of sleep, I've read some of your research on this and I've done a little bit of my own; but sleep and protein. I think it's pretty evident the benefits of having protein before bed as far as muscle protein synthesis. But reverse on that, can you talk to me a little bit about the improvements in sleep from a protein ingestion. I think that's related to tryptophan.

Stuart: There's two threads that we could talk about here. I think the first thing is when I'm talking to young athletes I always talk about the pyramid that you build to kind of stack on top. Everything that you're doing that you can put in place to make all of your workouts that you're doing as

beneficial as possible. I always say sleep is a big foundational principle. If you are not sleeping enough then I think you are shortchanging yourself.

Now, protein prior to sleep clearly you are offsetting the most probably longest negative protein balance period you have during the day. Some people no issues with doing that. Some people they find they can't sleep. Some people get really hot. I can't explain that one but that' something I've heard more than once. Other people find that their sleep is awesome after the ingest some protein. That really goes to the tryptophan question and the amount of serotonin in your brain and etc. I don't know enough about that to make an intelligent comment. I'll be honest. But we did publish some work with collaboration with an Australian group recently that young men who were sleep restricted, and this was done in a very controlled environment where these guys live and slept in the lab. The guys that had basically shorten sleep so they only sept for four hours as opposed to 8 had a lower muscle protein synthetic rate in response to restricted sleep.

If you did exercise, then you were able to overcome that. You were able to sort of offset that effect. I don't know that that would last for a long time, I'd be honest. I think if you keep having restricted sleep something is going to get messed up. I think now beginning to scratch the surface of the biology of sleep and its necessity probably in the recovery space form a mental standpoint. But I wouldn't doubt that there is a physiological and physical outcome. I mean, just look at cross sectional data on shift

workers versus non shift workers in terms of incidents of metabolic disease and lifespan and a whole lot of other things. We're made to be awake when it's light and asleep when it's dark.

Joel: What was that study? Do you recall any of that study?

Stuart: Yeah. The first author on the study is Nick Saner, and the corresponding author is Jon Bartlett. It was a collaboration between Victoria University in Australia and ourselves. It's in The Journal of Physiology. Sorry, I don't have the reference right at hand.

Joel: No, that gives me enough to find. You mentioned about the protein heat. Yes, I had read some of, I'm pretty sure it was your research, and I kind of said… Also, with some tips from Mike T Nelson.

Stuart: Good source. Good guy. Two thumbs up.

Joel: Yeah, absolutely. And he likes good music as well. After that, I said, "Hey, I'm going to program everybody to have a night time or before bed protein feeding." I did find that I had one client that said, "I sleep horrible when I have that protein. I'm feeling my sleep has gone downhill." And I said, "Okay, well then, let's stop doing that."

Stuart: Yeah. I think that that sort of highlights what we all now, right, is that everybody's… You know, we are all human beings but our unique genetic make up and our unique physiology means some people. You know, you

give 100 people a drug and 66 performed great and 23 are okay but really no change, but then 10 people it's a real adverse events. Why we should expect something different with respect to the training programming that we are doing or the nutritional interventions it all, you know, people are like, "Well, what do you mean it didn't work for you? You're doing it wrong." And I'm like, "Maybe it's actually it was never meant to work for this person."

I have a good friend in Germany and she mentors and gives nutritional advice to a lot of very, very good German athletes. Her experience has been is that there is a handful of them who say, "I sleep like crap", "I'm hot. I'm sweaty", I just don't feel good. I'm not doing it." How can you argue? Sleep disruption is probably worse for you than a short period of negative protein balance.

Joel: Yeah, and that was exactly my… I think my knee jerk reaction was, "No, that can't be why you are not sleeping better. The research says that protein is good at…" Yeah, absolutely. I think the more we learn it seems like the more that we realize that the advice we have to give is, "Hey, do you want try this?" Does this sound like a good thing to try? And then kind of experiment with it. I think it's a lot more difficult to say, "Hey, this is going to work for you definitively."

Stuart: Yeah. I mean, there is really… Once again, the pharmaceutical industry has figured this out a long time ago. You probably would be or probably

unsurprised, it's hard to say, at the tolerance threshold they have for how many people have to respond in a favorable manner. That's not to say that some people would respond in an adverse manner but sometimes they do. It expands all the way from give everybody a blood pressure drug, they knock off 30mm off of their systolic and diastolic, or they get no change, to some people whose blood pressure goes up. And you're like, "What's happening there? They are doing something wrong." I'm like, "Well, actually, maybe that's their response." Adverse response is something that we need to be mindful of in some of these situations. It may be a small percentage. It may be none. But to say that it's, "You're doing something wrong", is probably less correct to say, "Your physiology is different. Okay, it doesn't work for you."

Joel: Yeah, totally. That's why I like to see those scatter plots on the research paper where you can look for the how many people were extreme outliers.

Stuart: Yeah, no, it's a great way of representing the data. More people should be doing it, ourselves included. We are guilty of not really showing enough of the data. But we are aware of it and trying to move in that direction. Again, hand on heart, people need to show more of their data for sure.

Joel: Cool, Stu. Hey, I really appreciate. A lot of your work is some of my favorite. I appreciate getting the chance to talk with you.

Stuart: Absolutely. My pleasure. Thanks very much.

Stuart Phillips (April 2020 Live Q&A)

Lawrence: Awesome. Okay, so just one final question for you Stuart before we wrap up. I was just looking at your paper 'Recent advances in understanding resistance exercise training-induced skeletal muscle hypertrophy in humans. Your paper alongside obviously fair number of your colleagues which was a review I think. One of the things I pulled out of that paper was you were talking about the benefits of consuming protein and I quote, "Temporal proximity to resistance exercise." This point confused me a bit because I know for the longest time we all said, "You have to consume protein within half an hour of training." I think Brad did some work a while ago which kind of showed that time span to be far greater, that actually you could get away with having protein quite a bit later and still get the benefits. My question is, what does that mean 'temporal proximity'? You're just confusing the layman here. What is your thoughts I guess in terms of timing and quantity of protein consumption around training?

Stuart: It seems a little bit disingenuous to just to write close temporal proximity. I guess, if I was sitting in the witness box or I were the defendant in a court, I would have to say, "Well, please define close for us Dr. Phillips." So that's a valid question.

My take is this, first of all, I think that post exercise is a winner. I don't believe in pre-exercise; I do not say believe in it. I think there is less evidence and support of pre-exercise protein consumption supporting muscle protein synthesis and protein growth. But even our own work

shows that once you do a strenuous of resistance exercise, the "window" is open and Luc would give you his standard analogy for a long time, "It's not a window that opens and closes." Like it does for glycogen re-synthesis but it's more of a, again borrowing from Luc von Loon, "It's a barn door, and it's open for a long time." So not to be [unclear – 56:15] disingenuous, our point is that pragmatically you should try and consume some protein within a few hours. Exactly, if you consume it 10 hours later, 12 hours later, my thought is it would do a little bit less good for you. But it will definitely do you some good rather than sort of doing the resistance exercise and not eating anything.

You're right, I mean, there is no need to walk around with a shaker bottle of protein and slam it back as soon as you done your workout. I don't think that that gets you any further ahead. Again, if we haven't said it enough, that's probably the last twist of the rag to try and get the benefits back. You know, if you wait a few hours and eat a ham sandwich and drink a glass of milk then you are probably doing yourself just as much good. The difference probably caught up in the noise of we respond to these things.

I'll pin that one on the grad students that wrote the article. Might it just slip by my editing there so.

Lawrence: That's okay. No, it's fine. It sounded fancy anyway. So if you've got a hard stop now, I just got one quick question or do you need to wrap up?

Stuart Phillips (April 2020 Live Q&A)

Stuart: It's not a hard stop. I do have another meeting but it's one that I'm not leading, I'm just joining, so I can quietly slip into. My absence will not be too conspicuous.

Lawrence: Okay, we'll be very quick then. Joel just ask a good follow up which was in follow up to what you just said there, "Is there any evidence or have you done any research related to consumption of carbohydrate pre-exercise? What is your advice around nutrition pre-exercise?"

Stuart: Yeah, look, again research becomes mesearch, so I never eat anything before I work out. But I work out usually at 5:00, 5:30 in the morning, and I have a cup of coffee before I go and work out. And that's how I've worked out for a large part of my life, but I don't necessarily think that's the best way to work out. I think pre-exercise caffeine is a winner. If you ever want to test how effective something is from an ergogenic stand point, then put it up against caffeine. From that stand point I think pre-exercise carbs, yeah, okay. But I think the research will probably bear out that it's going to give you a small push. For most mere mortals I don't think it's that big of a deal. But if it's something that is part of your routine, something you can tolerate, and you do feel a boost, it might not be a physiology but just a feeling, and there's enough inside of me from a coaching perspective to realize that that's not a bad thing, then, by all means, go for it. You know, myself, it's not part of what I work into my training and I never say to athletes you have to do this, but that maybe because I've never worked

with athletes who again have tried to climb on the podium or be the best in the world. I had given them advice. I don't know whether they have ever followed it. I've never been the coach of those types of athletes but everybody's got their personal goals. And if you get a boost and feel a boost, then you are getting a boost and why not.

Lawrence: Awesome. Thank you for that. We've got another podcast scheduled I think somewhere in May, so excited to bring the rest of my questions along for that one which would be fun.

Stuart: Yeah, okay.

Lawrence: Thanks again for your time, Stuart. Really I'm grateful, really appreciate you taking the time out during what is a very strange time indeed. What's the best way for people to find out more about you?

Stuart: I'm on Twitter @mackinprof. I'm on Facebook, I have two pages, one which is personal but it's really not personal and I have lots of friends on there. I think I'm at the limit. Just Stuart Phillips, you can find me. Or I have a page that I try and push content out more than just having discussions with people and it's @SMPPh.D. I'm also on Instagram. I'm not a huge fan of Instagram but I do hop on it every now and again. I'm @mackinprof on Instagram as well. I'm on LinkedIn, and you can find me on all those platforms for sure.

Stuart Phillips (April 2020 Live Q&A)

Lawrence: You got a big social media following now haven't you? You've really grown now over the years.

Stuart: It's growing, yeah. It's growing and a lot of my colleagues actually mocked me for it because it's not seen as a fashionable thing for academics to do.

Well, I long ago decided that… I'm in Canada, all universities are funded by taxpayer's money so in effect on a civil servant and I try and push content out to the people that are paying for me to do the work that I do. I think that it's incumbent upon a lot of scientists to become more familiar with the platform. If nothing, pandemic has proved that points of view and information exchange, people want to know and they want to have a say. I think it's definitely worthwhile for scientists to have some sort of footprint on social media.

Lawrence: Absolutely, couldn't agree more. For everyone listening, participating, this is recorded and will be transcribed for future reference. Thank everyone for being a member. I really, really appreciate it. Next month we have Luke Carlson from Discover Strength, CEO of Discover Strength, joining us again for the May Q&A. I think that's pretty timely since we are going to be talking about recovering from this crisis, how do you get your business in the strongest position possible to grow and to succeed when you do reopen. But also, right now, in terms of how do you generate revenue now during the shutdown. DS is doing incredible in terms of generating revenue virtually with virtual workouts. I did a podcast with Luke the other

day and it's unbelievable what they've achieved in terms of revenue numbers and all will be revealed very soon in a podcast in a couple of weeks.

Stuart, thanks again, really, really appreciate it. I will let you go to your next appointment but looking forward to talking to you in May.

Stuart: Yeah. Thanks very much, Lawrence. Always a pleasure and thanks everybody for joining the call. I really appreciate your questions and taking your time. Everybody's most precious commodity is time, so thanks for giving me the forum for an hour or so.

Lawrence: Of course, you are most welcome and I'll talk to you soon. Take care.

Stuart: Yeah, take care.

Lawrence: Cheers. Bye.

Stuart: Great, man.