SNR #134: Are Supplemental BCAAs Worthless?

Hello and welcome to another episode of Sigma Nutrition Radio. I am your host Danny Lennon, head of performance nutrition here at Sigma Nutrition & Performance. And this episode marks the return of the solo episodes that have proved so popular in the past. In such episodes I've taken a specific topic and delved into the evidence base on it, some issues with practical application and what I feel we can confidently conclude on it. And each time one of these episodes has been put out there has been a great reaction, which is an honour as I know smart and clued-in you regular Sigma listeners are. So thank you for the feedback. And so I wanted to bring these episodes back with some regularity, as up to this point they've been extremely sporadic. And I thought the best way to get you valuable information was to do so through listener questions. So a number of weeks back I put out a call for questions from you guys on the email list and on Facebook. So I'm going to take some of these and use them to get into different topics. If you want to submit a question then for now I want you to do so on Instagram. Put up an interesting photo, write you question as the caption, and tag me in it :dannylennon_sigmanutrition

OK, let's get into this week's question which was submitted by Laura Walsh.

Laura asks: "After listening to the Donald Layman episode, you seemed a bit surprised (correct me if I'm wrong) that he recommends 5/6g of bcaa after workout rather than whey (I presume because it's a lot heavier on the stomach) , are you Still in the camp that bcaas aren't necessary intra/post workout?"

First, for anyone that didn't hear that episode it was #124 if you want to go back and listen. Dr. Layman is one of the heavyweight of protein research and I think you'll get a ton of info from that episode. Now, onto your question Laura…

Short answer is yes, I'm still in the camp that supplemental BCAAs aren't necessary intra/post-workout in the vast majority of cases. Now, we need to put some context on that.

Let's consider the instances where consuming supplemental BCAAs may be advantageous over simply consuming a source of protein:

1. Impaired digestion and absorption (e.g. during a race or other sporting event), may be easier to uptake free form amino acids rather than intact protein
2. GI distress on consuming whey protein during events. When we consider long-duration events, where there is likely more MPB, the net rate of protein degradation has been shown to decrease with BCAA supplementation.
3. If protein source has poor BCAA profile: e.g. fortifying a plant-source of protein with free form leucine to bump up the leucine content beyond the leucine threshold required to trigger MPS maximally

Typically when people ask about BCAAs or when you consider the folks who are touting their benefits the most, it's generally those engaging in resistance training with the goal of improving body composition.

To understand why it has been popularized that BCAAs are a worthwhile inclusion in any trainee's supplement stack, let's think about what the potential purpose of using them are. To promote muscle repair, recovery and growth we theoretically want to maximize the anabolic response. Particularly when we're talking about muscle hypertrophy, again theoretically we want to maximize net muscle protein balance. So remember, muscle protein balance is the net trade-off between two opposing process: muscle protein synthesis and muscle protein breakdown. In other words, we want to initiate the maximum muscle protein synthetic response as many times as we can over the day, whilst limiting muscle protein breakdown.

So where do BCAAs come in here? As we've discussed several times on the podcast before, the triggering of muscle protein synthesis in response to a protein feeding can be narrowed down to the BCAAs of that protein source, and actually pretty much specifically to one of those BCAAs, leucine. So to maximize the MPS response we need to hit a certain threshold of leucine. None of this is new information to you regular listeners. If none of this is making sense to you, then I'd recommend going back and listening to past episodes with the aforementioned Don Layman, as well as Caoileann Murphy and Brendan Egan. So while leucine is the main player in MPS initiation, we are generally still going to see BCAA supplements being used, most likely because ingestion of high amounts of leucine alone can potentially deplete plasma levels of the other two BCAAs valine and isoleucine, and so they are usually taken together.

Anyway, so that leads to the conclusion; just provide sufficient leucine or a BCAA supplement and you will maximize the MPS response. This is true. But here's my issue with this in practice:

What advantage will it have over consuming a full protein source that meets the requirement for leucine? In terms of MPS, there is zero advantage.

Is there a downside? Well, if we're talking about an isolated instance where we are say comparing consuming a BCAA supplement post-workout to consuming 30g of whey protein with an equivalent amount of those leucine in it post-workout, then we could make the case that the BCAA are actually going to be substantially inferior as there is no provision of the other essential amino acids that are required to repair and build muscle proteins.

So think about it, of the 20 amino acids, 9 are essential, meaning we can't synthesize them endogenously, therefore we need to consume them via the diet. The BCAAs are 3 of those essential amino acids. But to build/repair muscle protein we need all 9 essential amino acids. So while consuming BCAAs or even free form leucine will indeed trigger MPS response, we still need all the building blocks (all the amino acids) to actually create new muscle. So if you only consume a BCAA supplement you are essentially sending a signal to start the building process, but you haven't provided the raw materials to do so.

Now, what about if you've previously eaten a large protein meal, say before training, or you plan on having one soon. Then someone could make the case that we eliminate this potential issue. Correct. We do. BUT we actually also eliminate the need for the BCAA supplement in the first place.

And when we think about this from a pragmatic perspective, not only is there no advantage, there are potential disadvantages like cost. For the amount of leucine and actually total BCAAs they provide, a BCAA supplement is far more expensive than simply buying some whey protein. And when you are making recommendations to people, especially if you are a coach, then things like how much money people have to spend to include something potentially beneficial is a very real and important consideration. Getting clients to waste their money is one of the worst things that can happen.

So to round this up and to get back to explaining why I'm still in the camp of BCAAs being worthless in most cases, here's the lens I think we need to think about this question in:

When we consider the ranges we've seen suggested for daily protein by several of the research groups looking at resistance trainees (like Stu Phillips team at McMaster, Don Layman's lab, the team at Maatricht: Tyler Chuchward-Venne, Luc Von Loon, and many other groups.) we see the average recommendation to be anywhere from say 1.5-2.5 g of protein per kg of bodyweight. And we have also discussed many times that mazimizing MPS over the day can be achieved with probably 4 meals that contain protein with a leucine content above that threshold. So… here's the thing; if you are eating a protein intake within that range, and you're consuming 4 high protein meals per day, then in what possible way is a BCAA or leucine supplement going to augment the benefits you will get? Because to justify a BCAA supplement you need to be able to provide a mechanism for how it would be beneficial over a suitable protein source.

And to get to the original question, Laura mentioned how Donald Layman had discussed about potentially using BCAAs post-workout. Now his reasoning was not as much to elicit MPS, but rather he discussed it in terms of replacing the BCAAs that had been oxidized during that session. Essentially just a quick way to restore those to the amino acid pool, before later having a protein meal.

Now to me, this becomes a moot point once you consider it in the context of what we just mentioned: having a high daily protein intake, distributed across the day in approximately 4 servings that surpass the leucine threshold, and you are consuming one of those say within an hour or so of training, then you're fine. And in reality, when you think about the way anyone who is training hard or trying to gain muscle is eating, that's exactly what they're already doing.

And so for me it all boils down to this: if it's not superior to protein, and we know there are potential drawbacks, then why use it? In my opinion, it's simply because BCAAs are so heavily marketed, they're perhaps a cooler supplement to tell your friends you're taking, or certain coaches or "fitness authorities" have promoted them as magical.

So unless you are an endurance athlete who can't digest a protein source, or you are consuming protein sources really low in leucine, then you just don't need a BCAA supplement.

And that's my thoughts on it.

If you enjoyed this, or you're a BCAA fanboy who wants to send me hate mail, then hit me up on social media: I'm easy to find on Facebook and I'm dannylennon_sigmanutrition on Instagram.