

## Amino Acids and Healing: Interview with Luke Bucci, Part III

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Editor's note: This is the third part of Dr. Andersen's four-part interview with Luke Bucci, PhD, CCN. Part I was published in the June 19th issue of "DC"; Part II, July 17th. Watch for Part IV, Sept. 12th.

Dr. Andersen: Dr. Bucci, in your book, *Nutrition Applied to Injury Rehabilitation and Sports Medicine*, you had a nice chapter on amino acids. The branched chain amino acids have received a lot of publicity. What is your opinion on them?

Dr. Bucci: The branched chain amino acids just haven't lived up to their promise. They are in the essential group, and are very important for maintaining muscle mass because that's where a lot of the nonessential aminos come from. The ammonia gets torn off and the carbon skeletons get rearranged, and the ammonia gets put back on, and you have different amino acids. And cells can use the carbon skeletons for energy. But in many studies, patients were given a lot of branched chains in addition to other amino acids or in place of them, and they just didn't have a big impact like everyone hoped they would. I'm not really impressed with the branched chains.

Dr. Andersen: Even though proline is a key ingredient in the formation of collagen, in your book you do not recommend oral proline supplementation for injuries.

Dr. Bucci: Correct. I'm not impressed with oral proline supplementation because during collagen synthesis in the cells, the fibroblasts and other cells will make proline from whatever other amino acids are available. Proline itself is used for several things, including energy, so just giving extra proline hasn't led to any improvements in healing, which was kind of surprising. There is something else though that I think is pretty well established and does look like it will work, and that is called ornithine alpha ketoglutarate, or OKG.

Dr. Andersen: I have been reading about OKG in body-building magazines. They are pushing it as a steroid alternative. However, all the studies they are basing its "anabolic" properties on seem to be done on people with severe injuries such as burn victims.

Dr. Bucci: That has been its first application. It was developed in France. They stuck a couple of ornithines onto an alpha ketoglutarate. Alpha ketoglutarate is one of the carbon chains that you get derived from branch chain amino acids. It's part of the Krebs cycle. So it's a very important metabolic intermediate. But giving it by itself just didn't really do a whole lot. The body sort of cannibalized it for energy. However, when they chemically stuck a couple of ornithines onto it, they then had something that was much better than the same amount of ornithine and alpha ketoglutarate individually. That has been well documented in France where they first developed it, made it a drug, and studied it. Just about all the research on OKG has come from France. OKG was originally used in surgical wound healing.

Dr. Andersen: What are the dose ranges a chiropractor would use on a patient who has, for example, an injury such as severe disc inflammation or whiplash?

Dr. Bucci: For the conditions you described, 5 gm per day given in divided doses. In severe cases where patients will be hospitalized, the dose is 10 gm a day. The drawback to OKG is the price. Five grams a day of the real stuff will cost about \$3. In the United States there are a lot of bootlegged, "Shake 'n' Bake" ornithine and alpha ketoglutarate combinations. If you can't trace the source to pharmaceutical companies from France, I would recommend you spend your money elsewhere.

Dr. Andersen: I'm sure there are some bootleg versions, because what I have seen in the body-building magazines is less expensive.

Dr. Bucci: True. Also, many products just put in a few hundred milligrams and ignore the clear-cut data that says you need at least 5gm a day if it's going to work.

Dr. Andersen: Five grams a day is a large enough dose that you will encounter some compliance problems.

Dr. Bucci: Yes, that's why they put it in a powder so you mix it with juice or water and it dissolves quite well. It is extremely absorbable into the body. It turns out, and this is the really nice thing about OKG, that it boosts glutamine levels, is a precursor for glutamine, and a precursor for proline. There is the proline connection.

Dr. Andersen: So, to increase proline, give OKG.

Dr. Bucci: Exactly.

Dr. Andersen: Speaking of glutamine, you stated in your book that after injury, the levels of glutamine can be reduced by 50 percent, and that after stress an additional 30 percent. So, if we have an active patient who is now injured and on top of the injury they begin to get worried at their inability to either participate in sports or perform activities of normal daily living, this person could theoretically be as much as 80 percent deficient in glutamine.

Dr. Bucci: Yes, that is correct.

Dr. Andersen: Should glutamine be given orally? If so, what kind of dose?

Dr. Bucci: Glutamine is the most important amino acid in the body. There is more of it than all the others combined. It forms more things than just about any other amino acid. What the problem is, when you start giving glutamine, the body will use it for energy and break it down quickly, which is good. But because there is so much regulation of glutamine, you reach a limit where dietary glutamine will not raise glutamine levels. So, it never helps as much as everyone thinks it should.

Dr. Andersen: So, if a chiropractor wants to increase glutamine levels, don't give more glutamine, give ornithine alpha ketoglutarate?

Dr. Bucci: Exactly. Sometimes the obvious is not always the best way. In glutamine's case, you've got to find the back door. Also, because of the ornithine it contains, OKG probably has helped insulin and growth hormone levels. Every time you say growth hormone, that's what the body builders get excited about. Some of the research I have done in the past using ornithine by itself shows you can release growth hormone after oral ornithine, but it was only in about half the people and the doses were about 20 gm at a time, which caused diarrhea, and I speak from personal experience as a subject.

Dr. Andersen: It is interesting that what you consider the most important amino acid in the body is

not an essential amino acid.

Dr. Bucci: I hate that word "essential." It is ridiculous. Just from a dietary intake viewpoint, you can survive (which does not mean thrive) if you never get glutamine in your diet. But you have to have plenty of other amino acids instead. So that's the catch.

Dr. Andersen: Let's talk about another dipeptide that was in the news a few years ago, but I haven't heard much about it recently. That is, the amino acid carnosine. I heard it has antioxidant properties, wound-healing potential, and even could help reduce lactic acid. Did the studies not pan out?

Dr. Bucci: I think that everyone dropped the ball on carnosine. Because they don't know exactly what its role is in muscle, they are kind of backing away from using it heavily. But, it's one of the few amino acids that's actually looked good in all the studies. I think what happened is that it has graduated to the point where zinc-carnosine is now being studied heavily. There is a zinc-carnosine relationship they have not quite figured out, and when you use zinc and carnosine it does even better than plain carnosine. So, it might just be a way to get zinc into the right place at the right time, which would definitely help healing also. It might be preventing localized zinc deficiency.

Dr. Andersen: As far as the research on carnosine antioxidant capabilities and the capability to clear lactic acid, do you have an update?

Dr. Bucci: It's still continues. I think we are going to see some good things in the future. I don't know what's going to happen next, but I think that carnosine in the right dose will have really good potential. I think it's an intracellular buffer. I think it improves mineral metabolism. It works by helping other things out, kind of like taurine which also has a role in mineral metabolism and antioxidant status indirectly. Because it is a natural product, I think that has dampened research in the United States, but in Japan and Europe the drug companies are still very involved.

Dr. Andersen: What do you think about s-adenosylmethionine, also known as SAM?

Dr. Bucci: Oh, that's very interesting. As you know, it isn't a true amino acid. It is an activated metabolite of methionine. So, it's a methyl donor and it's a vital methyl donor.

Dr. Andersen: What kind of effects does it have on the body?

Dr. Bucci: It has anti-inflammatory effects. It promotes anything made from a methyl group which is DNA and RNA, and DNA regulation and creatine, so it's very important for many, many things.

Dr. Andersen: Can it be used for people with arthritis or injuries?

Dr. Bucci: Yes, it has been used in people with arthritis.

Dr. Andersen: What were the results?

Dr. Bucci: It looks about as good as glucosamine does, which is excellent. In fact, it does so well that the European drug companies have studied it. It is safer than the nonsteroidal anti-inflammatories and heals better than nonsteroidals do, but cost is the problem. So, they are licensing it for use in liver disease and other things where it's an antioxidant. Unfortunately, they are dropping the whole connective tissue angle with SAM.

Dr. Andersen: Would adequate demand lower the cost?

Dr. Bucci: I have some connections who are looking into that right now.

Dr. Andersen: How is absorption and what are the dosages?

Dr. Bucci: SAM is absorbed so well you only need around two grams per day to achieve a nice therapeutic effect. It's extremely important and used for so many things, its versatility reminds me of CoQ10. Cost is the only drawback.

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