

## Glycosaminoglycans: Interview with Luke Bucci, Part II

G. Douglas Andersen, DC, DACBSP, CCN

Editor's note: This is Part II of Dr. Andersen's four-part interview with Luke Bucci, PhD, CCN. Part I of the interview was published in the June 19th issue of "DC." Stay tuned for Part III (Aug. 15), and Part IV (Sept. 12).

Dr. Andersen: Dr. Bucci, in your book, *Nutrition Applied to Injury Rehabilitation and Sports Medicine*, there was an interesting chapter on glycosaminoglycans. There seems to be a controversy whether chondroitin sulfates are absorbed orally.

Dr. Bucci: Oh, yes. That's a lot of fun for me because it's one of these cases where a certain unnamed doctor who is working mostly for a supplement company boxed himself into a corner by finding an article on rabbits that used flawed technology to show that chondroitin sulfates were not absorbed well orally. If you look at the literature in humans, it is absorbed well. We're not rabbits, we're people.

Dr. Andersen: What is the dose range for chondroitin sulfates?

Dr. Bucci: I've had a lot of experience with this, and the company that I used to work for did have chondroitin sulfate. Number one, it must be pure, and there is no way to really know that unless you start using it. If it doesn't work, it might not really be pure. I've seen bogus chondroitin sulfate before. I have talked with the suppliers of chondroitin sulfate raw material that everyone uses, and they have two grades. There is a very crude grade that's really trachea powder, barely refined, which is perhaps 30-40 percent chondroitin sulfates in a form that is very difficult for the body to absorb. Then there is the really pure stuff that varies from 80-100 percent purity, and is quite absorbable, but is also much more expensive. The dosages, based on heart disease studies, are a gram or two a day.

Dr. Andersen: I had no idea the quality of chondroitin sulfates varies so much, and that there isn't an easy way to determine if a product is bioactive and absorbable.

Dr. Bucci: Overall, I think the situation is unfortunate, because when chondroitin sulfate is pure it can do some really amazing things. I think what has hurt chondroitin sulfate use is the fact that there have been sources out there that have not been pure. Practitioners must not purchase products without full disclosure labels.

Dr. Andersen: Dr. Bucci, is perna canaliculus the same substance as green-lipped mussel?

Dr. Bucci: Yes.

Dr. Andersen: What is this used for?

Dr. Bucci: I think it's a delicacy, but it is used for rheumatoid arthritis in particular.

Dr. Andersen: Does it work?

Dr. Bucci: I don't think so. It's not supported in the literature.

Dr. Andersen: What about hyaluronic acid or hyaluronate? Does it work?

Dr. Bucci: Yes, it works but it is really very specific for joints, especially synovial fluid as an injectable. In fact, it is licensed as a drug for vet use in the United States, but not for humans, interestingly enough. Orally no one has looked at it, which I find really surprising. I think they figure it is such a big long polymer that it can't get in and do the same type of mechanical things. I agree with that, but I think it is an expensive source of glucosamine.

Dr. Andersen: Speaking of glucosamine, it has been getting a ton of press, and is now sold by almost every company serving practitioners of nutritional medicine. What's the best type, what's the dose, and are there different grades of purity?

Dr. Bucci: I just received information I didn't have for my book. I prefer glucosamine hydrochloride for a variety of reasons.

Dr. Andersen: Everything I've read so far says glucosamine sulfate is the best form.

Dr. Bucci: Oh yes, that's what all the studies have been done on.

Dr. Andersen: Are you saying that glucosamine hydrochloride is a better form than glucosamine sulfate?

Dr. Bucci: Yes, but it's only slightly better. It's not a huge difference, but there's less room for fooling around with the hydrochloride than there is with the sulfate.

Dr. Andersen: Explain that.

Dr. Bucci: There's a nice little story. The reason the sulfate got all the studies from the Europeans is because the hydrochloride and the acetylglucosamine had already been patented, so the sulfate was pretty much the last one that could be patented.

Dr. Andersen: What do you mean by "fooling around?"

Dr. Bucci: Glucosamine sulfate is less stable than glucosamine hydrochloride. In fact, hydrochloride is used to stabilize glucosamine sulfate. What the nutrition supplement industry is doing now is using salt instead of glucosamine hydrochloride to stabilize the glucosamine sulfate. That is where there is room for fooling around with the label. The glucosamine sulfate that is commercially available in this country for supplement use is 20-30 percent sodium chloride. In some cases I think we are seeing 500 mg of powder, which is 20-30 percent salt. Glucosamine sulfate is wonderful stuff, but actual pharmaceutical studies have been done with glucosamine sulfate that is six percent glucosamine hydrochloride. So that's the rub. We have not duplicated that in the supplements sold in our country.

Dr. Andersen: I carry products whose label states it is pure 100 percent glucosamine sulfate with no fillers, binders, excipients, or coatings. It comes in capsules and is quite expensive.

Dr. Bucci: It's impossible to get pure glucosamine sulfate. You can't have it pure. You have to have a stabilizer in it.

Dr. Andersen: What advice do you have for chiropractors who prescribe products with labels that are supposedly full disclosure, but apparently are not?

Dr. Bucci: Good luck. I know a couple of companies who are true to their labels, the rest I haven't had a chance to analyze. Companies selling glucosamine sulfate popped up like mushrooms. This issue is important enough to state a name here. Dr. Kauffman from Progena Laboratories is aware of the situation, and he lists the actual glucosamine sulfate content on the label. He has factored in the salt amount, and what he is doing is putting in the extra raw material to make the glucosamine sulfate really be what's on the label. There is a product called Cosamin from Nutramax Labs in Baltimore, and they have glucosamine hydrochloride. They are actually the first ones with pure glucosamine in the United States.

Dr. Andersen: What is the dose for glucosamine supplementation?

Dr. Bucci: Based on the literature, the patient would need to take 1500 mg a day of the product for six to eight weeks. After that, they could either reduce their dose as symptoms dictate, or get off the product if they do not feel it was of benefit to them.

Dr. Andersen: What about companies who have products with only a few hundred milligrams of glucosamine in them?

Dr. Bucci: In the industry, this is what we call "fluff." A few hundred milligrams of glucosamine a day is not enough to have the therapeutic effect. However, it can have a placebo effect. Giving a few hundred milligrams of glucosamine would be like a family practitioner prescribing 100 mg of ibuprofen a day. And, speaking of ibuprofen, I would like to remind doctors considering using glucosamine that its analgesic effects do not become apparent until the product has been consumed regularly over an adequate period of time. It's not like non-steroidal, anti-inflammatories in which the patient will feel its effect shortly after dosage.

Dr. Andersen: Is there any research coming out on glucosamine hydrochloride?

Dr. Bucci: Yes, the Nutramax Company is conducting research with several different universities around the country. Some is mammal research which is a little bit tighter than human research, so the results should be real interesting.

Dr. Andersen: What about N-acetylglucosamine, the third form of glucosamine?

Dr. Bucci: Well, it's not bad, but it's not as good as the other two. I rank it a distant third because it is metabolized differently in the body. N-acetylglucosamine is used to form glycoproteins. It's hard to find a protein that doesn't have N-acetylglucosamine on it. When you give it orally, after absorption the liver and other tissues grab most of it, leaving very little for the joints. If you could take three or four times the dosages it might work.

Dr. Andersen: So, what do you recommend the N-acetylglucosamine form for?

Dr. Bucci: I think it is excellent and probably preferred for gastrointestinal problems, such as ulcers, colitis, and things like that. However, for musculoskeletal conditions, I would stick with glucosamine hydrochloride or glucosamine sulfate.

Dr. Andersen: The literature behind the glucosamine sulfate certainly is impressive, although I must admit I would like to see more current studies on this substance done in our own country.

Dr. Bucci: I have been trying to instigate some of that myself and I think I've gotten some ears turned finally. The problem is that it is patented pretty tight and no one can bust in on it, so no drug company will do it.

Dr. Andersen: Maybe all the companies that sell this stuff to chiropractors could take a percentage of their profits and fund a study through one of our colleges. I would like to see supplement companies that supply chiropractors get involved in more research. Well-designed, positive U.S. studies would make the news and skyrocket sales. If the research is negative, I would respect and expect those companies to publish the data anyway.

*G. Douglas Andersen, DC, DACBSP, CCN  
Brea, California*

JULY 1995