



Creatine Demystified: The Benefits, the Research, the Reality with Dr. Scott Forbes (ep – 71)

[00:00:01] **Dr. Scott Forbes** Creatine is not an anabolic steroid, but I think a lot of people get that confusion because creatine can help you grow muscles. So it has an anabolic stimulus to it, but it's not an anabolic steroid.

[00:00:17] **Dr. Ginger Hultin** If you follow health trends, you've definitely heard the buzz around creatine. Quickly becoming one of the most talked about supplements. Creatine is now showing up in conversations around healthy aging, cognition, sports recovery, and more. Sales are booming, research is expanding, and the interest in it is higher than ever. To help us understand the benefits and science behind creatine, I am joined today by Dr. Scott Forbes, an associate professor at Brandon University and a leading researcher in sports science and nutrition, with over 90 peer reviewed publications, including some of the most influential studies on creatine, muscle physiology, and brain health. So today we've got the right guest, the right science, and a chance to clear up the myths. Let's get to the bottom of creatine. Welcome, Dr. Forbes. Thanks for joining me to talk about one of the hottest health products out there right now, creatine. For anyone not familiar, can you give us a simple explanation of what creatine is and how it works in the body?

[00:01:28] **Dr. Scott Forbes** Creatine's just made up of three amino acids. Amino acids are the building blocks of protein. So anytime you're consuming protein, you're consuming individual amino acids that are put together, but if you put three of them together, then you create this molecule called creatine that can be taken up by cells in the body through a transporter. And then once they're in the cells, they get converted into this molecule called phosphocreatine. And kind of the simplest way to think of it is it's stored potential energy. So anytime you need energy, you can utilize this particular molecule to create it. And it's good for high intensity exercise. So it can create energy very quickly.

[00:02:11] **Dr. Ginger Hultin** Why has it taken off in the past couple of years?

[00:02:13] **Dr. Scott Forbes** Creatine was actually first isolated in 1832. And the first supplementation study was done in 1925. It took until about the 1990s where it was kind of really showing to increase creatine within the muscle. And they used this thing called a muscle biopsy. So they take small chunks of muscle out to examine what's happening within the muscles. And since the early 1990s, we knew that it can enhance exercise performance. Creatine can benefit the muscle and most of the creatine in your body is found within your muscle. So 95 percent of the creatine is located in muscle. Well-established that combining it with resistance training can make your muscles a little bit bigger and a little stronger and also enhance functionality in older adults as well. So if you're not very good at sitting and standing up, you're at a higher risk for fall. So it can improve sit-stand performance with creatine and exercise, that's pretty cool.

[00:03:14] **Dr. Ginger Hultin** Another thing that I know it's used for is recovery following injury or surgery. What can you tell me about that?

[00:03:22] **Dr. Scott Forbes** So there's been two immobilization studies. So they put a cast on the participants and give them either creatine or placebo and see the effects that that creatine has. And one of the two studies found a positive effect. So while they're wearing the cast, they lost less muscle mass, and they lost less muscle strength as well. And the other study showed no benefit during immobilization.

[00:03:48] **Dr. Ginger Hultin** And then what about something that I've been hearing people talk about quite a bit, dehydration, cramping, like muscle cramp with creatine. What's the evidence showing about that?

[00:03:59] **Dr. Scott Forbes** The complete opposite, but people are saying that it actually causes muscle cramps. And yeah, it does the complete opposite. So we know that it hydrates the muscle. So if you bring creatine into the muscle, it can actually pull a little bit of water into it. So it has intracellular increase in water. So it's hydrating the muscle. There's actually evidence in football players that it reduces muscle cramping. So the complete opposite of causing muscle cramps that actually reduces the incidence of muscle cramps. And it's also been shown in clinical settings as well. So individuals receiving dialysis have an increased risk of cramp as well, muscular cramps. And they found in that population that if they took creatine, it actually reduced muscle cramps as a symptom.

[00:04:46] **Dr. Ginger Hultin** One thing that I am especially interested in is some of the research coming out about creatine's role in cognition. So supporting memory, attention, even recovery from traumatic brain injury.

[00:05:00] **Dr. Scott Forbes** We know that creatine can get into the brain. So if you supplement with creatine, you can get about a five to 10 percent increase in creatine within your brain. Whereas at the muscle level, it's actually kind of a greater response. You get about 20 percent increase. Creatine can reduce inflammation, oxidative stress. Those are some things over time that could be bad for the brain or a cell, but essentially it can provide more energy to the brain, and there's evidence in older adults that it can improve memory, and it can improve the kind of cognitive processing in other situations as well.

[00:05:37] **Dr. Ginger Hultin** I've been seeing some research that's starting to look at it even with Alzheimer's disease.

[00:05:41] **Dr. Scott Forbes** So they actually have lower amounts of brain creatine content than a non-Alzheimer's individual. There's one pilot study to show that it could be a benefit. You can get creatine into the brain, and it can also improve cognition in that population, and then traumatic brain injury as well is another situation where the brain is stressed. It relies on that energy system a little bit more. And there's good animal studies to show that it could be a benefit, and there's one human study where they gave a fairly high dose of creatine, and this study was in children and adolescents following a severe traumatic brain injury, and they showed several of the symptoms were improved with creatine supplementation.

[00:06:27] **Dr. Ginger Hultin** Interested in giving creatine a try? Orgain Creatine Monohydrate Powder delivers five grams of micronized creatine. The micronized formula dissolves easily into water, juice or smoothies with no gritty taste. Widely trusted by healthcare practitioners and customers alike, it's vegan, gluten-free and has no additives. It's a great way to support your muscles and your mind. Find it at orgain.com. What about creatine and sleep?

[00:06:59] **Dr. Scott Forbes** That's another situation where creatine has been shown to be a benefit. So creatine could be a better fit for older adults to improve memory. For younger adults in a normal, kind of healthy, rested situation, it does not have this brain powering effect. If you're young and rested, it's not gonna help your cognition. But if you're sleep deprived, there is some evidence that it can actually improve cognitive function. We know that if you are sleep deprived your passing accuracy would go down. But if it's you took creatine, it actually completely abolished the negative effects of sleep deprivation in these rugby players on their ability to pass the rugby ball. So from a sport, performance perspective, yeah, if you get a bad sleep because you're nervous before a big game, then it could be a benefit. But I also think of like medical professionals, doctors, maybe they get a bad sleep and have a long

shift, or nurses and they have to do things accurately. That's very important. I think it could be a benefit in those situations.

[00:08:04] **Dr. Ginger Hultin** There is some chatter online about creatine's anti-aging properties. Like, it's good for your skin, hair, nails. Is that true?

[00:08:15] **Dr. Scott Forbes** We do know a little bit about hair. So we actually did a hair loss creatine study very recently, and we worked with a hair doctor, and we gave creatine for three months, and we measured follicle health, and we showed that creatine actually has no effect on direct measures of hair. So it's not gonna benefit your hair, but it's also not gonna be detrimental as well.

[00:08:39] **Dr. Ginger Hultin** Thinking about other important structural tissue, I think there is a link perhaps that's emerging about bone health and creatine.

[00:08:48] **Dr. Scott Forbes** It's well established that combining creatine with exercise resistance training can improve muscles, and the muscles are attached to tendons, which attach to the bones. And so anytime you do a muscle contraction, that's gonna stress the bone a little bit. So there's some kind of direct mechanisms and potentially indirect through the muscle benefits of how it can actually enhance bone. There is a study where they did two years of resistance training three times a week. Plus they also did a walking program as well, and they showed no effect on bone mineral density with creatine, but they did find improvements in bone geometry or the architecture of the bone.

[00:09:31] **Dr. Ginger Hultin** I'm really interested in general guidelines or if there's any specifics for athletic performance, healthy aging or cognition, and like where the average person starts with this.

[00:09:42] **Dr. Scott Forbes** So from a muscle perspective, three to five grams per day is sufficient. From a bone health perspective, no study using less than about eight grams of creatine per day has shown any benefit. This is where kind of the dose might depend on what you're trying to improve. For brain health, we really don't know the best dose. We think a little bit more is required because you have fewer creatine transporters. At the blood brain barrier, and we think around 10 grams per day is ideal based off one individual study that looked at two grams versus four grams versus 10 grams and they showed that 10 grams led to a greater increase in brain creatine content. So my general recommendation is for muscle, that's your only focus, just three to five grams per day. If you're trying to improve bone health and brain health, around 10-grams per day is optimal.

[00:10:41] **Dr. Ginger Hultin** And then also timing, I'm interested in how you dose creatine, especially around exercise, resistance training, aerobic exercise.

[00:10:50] **Dr. Scott Forbes** Timing is not one of the major factors, but there is some evidence that you take creatine close to that exercise. It can help with the creatine uptake. There was a pretty cool study where they just did cycling with one leg, unilateral cycling, and then they dosed them with creatine, and they took muscle biopsies from both the exercise leg and the non-exercise leg. And the exercise was able to take up a little bit more creatine than the non exercise leg. So if somebody is exercising, I suggest to take creatine around that exercise. Once you ingest it, it takes about two hours for it to peak in the bloodstream. So as long as you're within that range where it's starting to peak within the blood stream.

[00:11:36] **Dr. Ginger Hultin** Well, I'd love to hear the background on these wildly successful articles you wrote. There was part one and part two in the Journal of the International Society of Sports Nutrition about common misconceptions of creatine. At the end of each section, there's like a little recap of no, this is not true, or yes, this true. And I wanted to not ask all of them, but some of them to see if you can give us some of those one-liners. I'm gonna start with one that you might need to actually define for folks. Is creatine an anabolic steroid?

[00:12:07] **Dr. Scott Forbes** When you ask what is creatine, it's made up of three amino acids, which is the building blocks of protein. So it's not a steroid. Steroids are lipid-based, so they can go through kind of membranes and directly into cells and things like testosterone or different forms of anabolic steroids that people might be taking to enhance muscle growth. Creatine is not that. And that's clear based off the biochemistry of creatine, that creatine is not an anabolic steroid. But I think a lot of people get that confusion because creatine can help you grow muscles. So it has anabolic stimulus to it, but it's not an anabolic steroid.

[00:12:52] **Dr. Ginger Hultin** I want to take a quick pause for some nutrition news. I was fascinated to learn that creatine was discovered way back in 1832, and I wanted to know more. It turns out, creatine didn't hit the mainstream until 1992, when athletes preparing for the Olympic Games in Barcelona started using it and seeing results. Fast forward to today, and the creatine market was valued at around 200 million in 2023, with projections suggesting it could reach half a billion dollars by 2033. So why does this matter? With its popularity only continuing to rise, it's important to understand where creatine might fit into your health goals. Whether you view it as a trend or not, creatine is a well-studied supplement with real evidence behind it. Knowing what the research says can

help us make better, more informed choices for our long-term health. All right, let's get back to the conversation. Does creatine lead to water retention?

[00:13:57] **Dr. Scott Forbes** That's also a pretty big myth as well, that you're just gonna fill your muscles with water, and that's all it's gonna do. It is true that you might pull a little bit of water into the muscle, particularly if you take a higher dose of creatine, and that actually stimulates the muscle growth. There's some research that's done in Brazil that showed after eight weeks that the muscle is bigger, and because the muscle's bigger, you also have more water, because muscle has made it to 75 percent water, but that ratio of the size of the muscle to how much water was in it was actually the same after eight weeks compared to the start of the study suggesting that it doesn't fill your muscles with water for kind of endless periods of time.

[00:14:43] **Dr. Ginger Hultin** I'm glad you myth busted that one. And this one is close to my heart because I did my doctoral research on kidney disease, end-stage kidney disease and dialysis. So for those folks, does creatine cause kidney damage?

[00:14:56] **Dr. Scott Forbes** At the end of the day and the recommended doses, there's no evidence that it actually does any harm to your kidneys. And I think this misconception is because metabolites of creatine, so it's broken down into creatinine. Creatinine's often measured in the blood as an indicator of kidney dysfunction. So if it starts to rise, that can mean that your kidneys are not healthy. But if you're taking creatine, and you have more creatine in your system, in your body, marker of kidney function can naturally rise without indicating kidney dysfunction. So you need to measure other things if you're taking creatine as a supplement.

[00:15:37] **Dr. Ginger Hultin** And then you also mentioned that for people in dialysis, it was helping with muscle cramping. And so this seems pretty nuanced that people can work with their nephrologist on, but shouldn't just be off the table by any means.

[00:15:48] **Dr. Scott Forbes** Yeah, there was actually another recent study showing improvements in muscle performance in individuals going through dialysis. So through dialysis, you actually lose creatine, you lose muscle mass, there's impacts on cognitive function and all these things that creatine can benefit. So there's still limited studies in that particular population, but based off the studies that are available, it seems to be safe and effective.

[00:16:14] **Dr. Ginger Hultin** Does creatine increase fat mass?

[00:16:17] **Dr. Scott Forbes** The complete opposite. It doesn't have a profound effect on fat loss, but at least it's heading in that direction. So we did a couple of reviews, but one of the reviews showed that you lose about a half a kilogram more fat mass compared if you take creatine compared to placebo and while performing exercises. So it seems to be helping in that correction and helps you get bigger muscles as well. So if you can get improvements in body composition, bigger muscles. And lose some fat mass, I think that's at least heading in the right direction.

[00:16:51] **Dr. Ginger Hultin** How about creatine and caffeine?

[00:16:54] **Dr. Scott Forbes** There is some theoretical evidence that they could oppose each other. They have opposing effects on calcium handling within the muscle and that can influence muscle contraction and relaxation. So there was some thought that you should not consume them at the same time. We've recently did a training study where we combine creatine and caffeine, and we measured changes in muscle thickness or muscle size in a variety of different sites in the body. And one of those sites was actually negatively impacted by combining creatine and caffeine at the same time compared to just creatine. But all the other sites, there was no difference. And it was a fairly small study as well. So I feel like we need more research in this area.

[00:17:37] **Dr. Ginger Hultin** Sure.

[00:17:37] **Dr. Scott Forbes** My personal opinion is, if you really wanna maximize the benefits of creatine, take them at different times. Maybe take caffeine before you exercise, and take creatine after.

[00:17:49] **Dr. Ginger Hultin** Sure.

[00:17:49] **Dr. Scott Forbes** But for 99 percent of the population, I don't think it makes any meaningful effects.

[00:17:56] **Dr. Ginger Hultin** Does creatine cause cancer?

[00:17:58] **Dr. Scott Forbes** There's no evidence of that. So we know there's cancer or cachexia, so loss of muscle mass and strength in that population and functionality. And taking creatine could actually be a benefit. And again, there's some large data sets where they've shown reduced cancer risk. There is some animal or cell culture studies that suggest that creatine can actually cause cancer. And they use such extreme doses and they lack some of the complexities of what's actually happening in a human. So, yeah, those needs to be interpreted with a ton of caution and the human studies would actually refute that.

[00:18:37] **Dr. Ginger Hultin** Is creatine anti-inflammatory?

[00:18:41] **Dr. Scott Forbes** There is some evidence for that as well, particularly after aerobic exercise where you can have muscle damage and create some inflammatory responses. There's some evidence that it could actually reduce, again, muscle damage and also inflammation as well.

[00:18:57] **Dr. Ginger Hultin** I have one more for you. Does creatine influence blood pressure?

[00:19:01] **Dr. Scott Forbes** No, it does not. People think that it's gonna cause this water retention, and that's gonna create the kind of effects on blood pressure, but there's no evidence that it could actually have any impact on blood pressure.

[00:19:15] **Dr. Ginger Hultin** Thank you so much for all those myth busting. If you're looking online, you're gonna see powders, capsules, gummies, micronized versions, and then sometimes there's like protein or collagen or caffeine in there. Is there a difference in absorption? What should people aim for?

[00:19:30] **Dr. Scott Forbes** Just get creatine monohydrate. Powder is the most studied form of creatine. There's now, yeah, as you mentioned, creatine gummies on the market. There's been no creatine gummy study as of yet. There is some evidence that those gummies do contain creatine monohydrate. But there's also some evidence that some of the creatine gummy companies have been measured and they actually have no creatine within them. So buyer beware with regards to kind of getting creatine gummies. But yeah, the current evidence suggests that creatine monohydrate powder is kind of the best form of creatine.

[00:20:04] **Dr. Ginger Hultin** Is there any groups or types of people that should avoid or use caution when using creatine?

[00:20:11] **Dr. Scott Forbes** There's a couple of populations that I think we need more research in to clearly show the safety. One is if you're pregnant, they actually gave 15 grams of creatine for three days during the third trimester of pregnancy. And they showed that it was safe in that population. They metabolized creatine very similar to non-pregnant women. But again, I think we just need a little bit more data before we can confidently say that individuals that are pregnant take creatine. And then there is evidence that it is safe and effective for children and adolescents to take creatine. Just my personal opinion is there's other things to focus on for children in particular. Maybe if you're 16,

17 years old and you're an elite athlete, maybe you can consider creatine in certain situations, but for most kind of children and adolescents, I just don't think it's, kind of the effects are that profound, and it's really necessary for that population to take creatine.

[00:21:11] **Dr. Ginger Hultin** Last question. What's one thing about creatine you wish more people understood?

[00:21:17] **Dr. Scott Forbes** I think that it's both kind of an underrated supplement because it can have effects on a variety of different tissues in the body. So it can enhance muscle, bone, and brain health and things that we talked about today. But I also think that creatine is also overrated as well. So people think it has these kind of profound effects. So I think just understanding the science and hopefully we did that today to translate what does the science actually say, and which situations should you consider taking creatine?

[00:21:47] **Dr. Ginger Hultin** Thank you so much. It was really fun to dive into the research that you've done. So there you have it. The science has matured, the myths have been addressed, and now we're seeing creatine's role expand into healthy aging. As Dr. Forbes put it, creatine is both a little underrated and a little overrated. The benefits are definitely there, but are likely more modest than some advertisers and influencers may have you believe. For people who want to give creatine a try, treat it like any other supplement you're interested in. Consider your personal needs and what benefits you're hoping to seek. Thank you so much for joining me on this episode of The Good Clean Nutrition podcast. If you enjoyed today's conversation, please leave us a review on Spotify, Apple, or wherever you listen. See you next time.

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