

Creatine by Christian Running

In any exposition, a basic description of the herein described object must be given. In this case, we are discussing creatine, which is a nitrogenous acid that assists in creating energy in the body. Creatine ($C_4H_9N_3O_2$) is naturally found in the human body and other places like beef. It is used by the body to create energy, specifically in muscle, by a process called re-phosphorylation. The human body's main source of energy is a molecule called adenosine triphosphate (ATP). When this molecule is used (broken down, which releases energy) for a process it becomes adenosine diphosphate (ADP). The change in name is due to the number of phosphate molecules attached. To create more energy the body adds back a phosphate molecule from free floating creatine phosphate (CrP) molecules in the extra-muscular space, turning it back into ATP. The theory behind creatine is that by having more creatine in the body, the muscles will create more creatine phosphate in the extra-muscular space, allowing for more rapid re-phosphorylation and more rapid energy.

Creatine or creatine monohydrate, to be exact, has been the subject of debate in the exercise and performance field as of recent years. By some, it has been seen as a valuable supplement that helps you gain lean mass and strength at greater rates. By others, it has been seen as an effective way of bloating and retaining water. Now I am not here to say one side of the other is wrong, but research tends to be a better indicator of the truth than anecdotes and hearsay. Of course research does not always cover all the questions. In this article I will attempt to address two often asked questions: Are there any risks involved? Does it work?

As this supplement has grown in popularity in the general population as of late, the same is true of its popularity in the research community. In 2003, Van Loon et al. researched the effects of creatine on two modes of exercise including endurance training (VO_2 max) and High Intensity Interval Training (HIIT). They tested not only short term effects, but also long term and post-supplementation effects. To do this they ran control tests prior supplementation, after a six day loading phase, for the duration of a 37 day maintenance phase, and at the end of the whole 42 day process. This study was a random, double blind study done with the consent of all participants.

The tests they used to in this study were pretty simple. They used a cycle ergometer (essentially a spin bike) for both test. The endurance test was essentially a maximal test to see how much oxygen they could utilize at their highest work threshold. The results showed no significant change between the two test groups over the entirety of the study. Practically, what this looks like is pretty obvious: Creatine does not enhance your cardio.

The second part of the testing involved having the participants to 12 interval sprints at a 12:48 second work to active rest ratio. After the six day loading phase, the creatine group show statistically significant improvements in performance. This performance remained even after the 37 day maintenance phase. The first part was clearly from the use of creatine, however the residual effects following the maintenance phase have two possible attributions. The first is that the re-phosphorylation of ATP occurred quicker

due to the higher levels of overall creatine phosphate in the extra-muscular space. The second is simply that the creatine group had developed more mass in the muscles involved in the sprints via creatine as well. In this particular study no adverse effects were found or attributed to the use of creatine, Use of creatine, however, in higher doses was not accounted for in this study. Anecdotal evidence has shown that due to the excess energy provided by the supplement, overuse injuries have occurred. In rare cases, consumption of large doses of creatine have led to kidney problems and indigestion.

So now we know that it works, but what can it be used for. Creatine can assist in any high intensity workout that has a short duration. Examples of activities like these would be sprints and weightlifting. Creatine has been shown to have little or no effect at all on cardiovascular activities, or any other activity that is low to moderate in intensity level. The article by Van Loon et al. is one of many peer-reviewed journal articles that all state the effectiveness, and lack of risks involved with creatine. However, keep in mind that every body is different and will be affected differently by what is put into it.

Disclaimer: The Belmont Athletic Club wishes to state that in no way, shape, or form is it promoting supplementation of any kind and is not liable should anyone decide to consume any. The purpose of this article was simply to objectively look at the effects of a commonly used supplement in today's fitness population.

References

Van Loon, Luc J.C. "Effects of Creatine Loading and Prolonged Creatine Supplementation on Body Composition, Fuel Selection, Sprint and Endurance Performance in Humans." Clinical Science. Portland Press, 01 Feb. 2003. Web. 26 Nov. 2015.