THE DOMINANT ONE

What is Creatine? Is it Safe?
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Background/Introduction
Creatine monohydrate is an amino acid that is produced inside the human body. Every person makes a small amount of creatine each day; estimated to be around 1 – 1.5 grams/day. As part of our metabolism, creatine interacts with other compounds that result in a production of energy. With this energy, the cells of the body can perform any number of their important functions. When talking about creatine in the context of athletics and exercise, the cells inside our muscles take center stage. The best dietary sources of creatine are animal meats such as beef, pork, salmon, cod and herring (Buford 2007). The amount of creatine shown in research studies to be effective for exercise uses would require an individual to consume at least a pound (or more) of certain meats a day. For these reasons, supplementation with creatine has become popular.

Supplementation of Creatine
When used a nutritional aid, creatine helps to increase the body's ability, specifically muscle cells, to reproduce energy through increases in phosphocreatine stores inside the muscle (Kreider 2003; Buford 2007). The most common regimen of supplementation with creatine employs a 'loading phase' and a 'maintenance phase'. The loading phase typically consists of four daily doses of five grams each for a total of 20 grams per day (Williams 1999). This regimen is typically performed for five days, but can range from three to seven days. It is common for muscle creatine levels to increase by 10 – 30% and phosphocreatine to increase by 10 – 40% during the loading phase (Kreider 2003). A typical maintenance phase has an individual consume anywhere between two and ten grams of creatine each day with the most common maintenance doses being five grams per day (Buford 2007). A four to five gram dose would be equivalent to a spoonful on any standard kitchen spoon. When supplementation is stopped, creatine levels gradually fall and return back to pre-supplementation levels after six weeks (Vandenberghe 1997; Candow 2008).

Creatine and Exercise Performance
With a greater potential to reproduce energy which is rapidly consumed during intense exercise, research studies in exercising athletes consistently report improvements in many types of exercise performance. In a comprehensive review of the scientific literature in 2003, Kreider indicated that around 300 research studies have evaluated the performance-enhancing effects of creatine supplementation in athletes. Collectively, it was estimated that 70% of these studies indicate that creatine can benefit some aspect of exercise performance while the remaining 30% of the studies typically reported improvements in performance, but not to the extent they were considered statistically significant. As an example, athletes who engage in short-term creatine supplementation can expect to experience a 5 – 15% increase maximal strength and power. Similar improvements (5 – 15%) are also commonly reported in the amount of work performed during multiple sets of maximal effort contractions. Performance with single sprints typically improves by 1 – 5% while the total amount of work performed when exercise bouts contain multiple sprints is commonly 5 – 15% (Kreider 2003; Buford 2007).

A number of studies consistently report that creatine use while resistance training can lead to greater improvements in lean tissue and body composition (Vandenberghe 1997; Kreider 1998; Kirksey 1999; Peeters 1999; Stone 1999). In these studies, creatine was typically provided in a

loading dose and then a maintenance dose for the remainder of the study. Studies ranged anywhere from 4 – 12 weeks and included some type of resistive exercise, whether it be resistance training or sprint training. Two studies in particular are of interest because they employed collegiate football or track and field athletes as participants and found favorable results (Kirksey 1999; Stone 1999).

Creatine and Safety

Supplementation in healthy individuals (young or old) has not yielded any known side effects or adverse events. The only exception would, paradoxically, be weight gain as weight gain for weight-conscious athletes such as wrestlers, gymnasts, etc. is considered a side effect, but for many athletes who use creatine this is a desired response (Kreider 2003). Many clinical studies have employed creatine use for up to five years with no adverse outcomes (Vannas-Sulonen 1985) and Kreider and colleagues completed an investigation over two years in collegiate football athletes which also indicated no adverse events (Kreider 2003). Additional research has looked into the incidence of cramping and muscle-related injuries in collegiate baseball and football players, again with no negative findings (Greenwood 2003; Greenwood 2003). Lastly, studies have also examined the impact of liver and kidney health on supplementation and no negative outcomes were reported (Mayhew 2002; Kreider 2003).

Conclusions

As a nutritional supplement, creatine is easily the most researched supplement on the market today. It is safe to estimate that over 500 research studies have been published investigating its impact on health and performance in both active and clinical populations. The scientific literature surrounding creatine suggests that it can be safely employed as a dietary supplement in people who exhibit to current health problems. Additionally, studies using children or adolescent athletes also support these general conclusions as well where studies in competitive adolescent swimmers and soccer players have been well tolerated and improved performance (Grindstaff 1997; Ostojic 2004).

Key References on Creatine

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