

Commentary

Impact of creatine supplementation on muscle performance and kidney function

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DESCRIPTION

Creatine is a popular dietary supplement widely used by athletes, bodybuilders, and fitness enthusiasts to enhance muscle mass, strength, and exercise performance. It is naturally found in small amounts in certain foods like red meat and fish and can be synthesized by the body. The supplement form, usually in powder, has gained significant attention for its potential benefits. Creatine exerts its effects primarily through its role in the phosphocreatine system, which rapidly generates ATP, the primary energy currency of cells. This mechanism supports high-intensity physical activities and may also offer neuroprotective benefits.

Creatine metabolism and kidney function

Creatine is a compound formed from the amino acids arginine, glycine, and methionine. It is essential for energy production, especially during high-intensity exercise, by replenishing Adenosine Triphosphate (ATP) stores in muscles. Supplementing with creatine has been shown to have several benefits, including

Increased muscle mass and strength: Creatine supplementation can lead to significant gains in muscle mass and strength, making it a favourite among bodybuilders and strength athletes.

Enhanced athletic performance: It improves performance in high-intensity, short-duration activities such as sprinting and weightlifting.

Improved recovery: Creatine helps reduce muscle cell damage and inflammation following exhaustive exercise, promoting faster recovery.

Cognitive benefits: Creatine may exert neuroprotective effects by reducing oxidative stress and mitochondrial dysfunction, which are implicated in neurodegenerative diseases.

The main concern regarding creatine supplementation revolves around its potential impact on kidney function. The kidneys filter waste products from the blood, and creatine metabolism produces creatinine, a waste product eliminated through the kidneys.

Elevated levels of creatinine in the blood can be a marker of kidney dysfunction. This has led to concerns that long-term creatine supplementation might burden the kidneys.

Several studies have investigated the impact of creatine on kidney health, with the majority indicating that creatine supplementation does not adversely affect kidney function in healthy individuals.

Short-term and long-term studies: Research ranging from a few weeks to several years has shown no significant adverse effects on kidney function in healthy individuals. These studies monitored markers like Blood Urea Nitrogen (BUN), serum creatinine, and Glomerular Filtration Rate (GFR), finding no detrimental changes.

High-dose supplementation: Studies with high doses of creatine (up to 20 g per day) over short periods have not reported harmful effects on the kidneys of healthy participants.

Pre-existing kidney conditions: Caution is advised for individuals with pre-existing kidney conditions. Although creatine has not been definitively shown to exacerbate kidney problems, those with impaired kidney function should consult a healthcare professional before starting supplementation.

Practical considerations

While the majority of research supports the safety of creatine supplementation for healthy individuals, certain best practices can help minimize potential risks:

Dosage: Typical dosing involves an initial loading phase of 20g per day (divided into 4 doses) for 5-7 days, followed by a maintenance phase of 3g-5g per day. Skipping the loading phase and starting directly with the maintenance dose is also effective and may reduce gastrointestinal discomfort.

Hydration: Adequate hydration is essential when supplementing with creatine, as it can cause water retention in muscles. Staying well-hydrated helps support kidney function.

Quality of supplement: Choose high-quality creatine supplements from reputable brands to avoid contaminants that could harm health.

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Regular monitoring: Individuals, especially those with concerns about kidney health, should consider regular monitoring of kidney function through blood tests to ensure safety.

Creatine powder is a well-researched and widely used supplement that offers numerous benefits for muscle growth, athletic performance, and recovery. The majority of studies indicate that it does not adversely impact kidney function in healthy individuals

when used as recommended. Before starting any supplementation, individuals with pre-existing kidney conditions should consult healthcare professionals. With proper usage and precautions, creatine can be a valuable addition to a fitness regimen, contributing to enhanced performance and overall physical well-being.