



Creatine (*Creatine monohydrate*)

Common Indications:

- Antioxidant
- Enhanced muscle mass; improved strength.
- Exercise and fitness performance and improvement.
- Promotes protein synthesis.
- Neuroprotective

General Comments:

Creatine is a nutrient produced in the human body and also derived from animal proteins in the diet. It is stored primarily in skeletal muscle and is converted to phosphocreatine, which is used to create ATP and thus energy for high-intensity muscle contraction.

Creatine is naturally synthesized in the human body from amino acids primarily in the kidney and liver and transported in the blood for use by muscles. Approximately 95% of the body's total creatine content is located in skeletal muscle. Creatinine excreted in urine is derived from creatine stored in muscle.

Creatine is used to enhance athletic performance and to increase muscle mass in athletes and older adults. It may also be used to treat congestive heart failure, retinal degeneration, hyperlipidemia, and neuromuscular diseases

Benefits & Mechanism of Action:

Exercise and Sports: Creatine is used in muscle tissue for the production of phosphocreatine, important in the formation of adenosine triphosphate (ATP). Creatine is one of the most widely researched and scientifically validated supplemental nutrients for athletic performance and recovery.

Research reports creatine supplementation improves adaptation to exercise, probably due to an increased ability to workout harder and longer. This can result in increased lean body mass and enhanced exercise performance, endurance, and recovery. A meta-analysis in 2002 reported that creatine supplementation combined with resistance training increases maximal weight lifted by young men (difference in maximum weight lifted was 6.85 kg greater with creatine than placebo for bench press and 9.76 kg greater for squats).

Creatine can also act as an antioxidant, which was demonstrated by a decrease in oxidative stress markers in a study of creatine use in resistance exercise. Supplementation with a magnesium-

creatine chelate has been reported to improved performance, body mass, peak power, and intracellular water, with less muscle soreness, compared to creatine monohydrate and placebo.¹⁻¹²

Neuroprotection: Creatine has been reported in studies as a useful agent in slowing the progression of Lou Gehrig's disease, Parkinson's Disease and for muscular dystrophies.

Creatine is reported in laboratory studies to protect against excitotoxic lesions produced by N-methyl-D-aspartate, malonate and 3-nitropropionic acid (3-NP), inhibitors of succinate dehydrogenase. In laboratory animal studies, creatine produced an extension of survival, improved motor performance, and a reduction in loss of motor neurons in a transgenic mouse model of amyotrophic lateral sclerosis (ALS). Creatine is being studied in clinical trials for reducing plasma levels of 8-hydroxy-2-deoxyguanosine in Huntington's disease patients.¹³⁻¹⁵

Mood: Antidepressant activity has been demonstrated using several different animal models. Creatine appears to interact with several neurotransmitter receptors, including dopamine, serotonin, and N-methyl-D-aspartate. Interestingly, this action was observed only in females.¹⁶

Dose:

10gm daily, in divided doses, for 1 week during the loading phase, then 5gm daily during the maintenance phase.

Symptoms of Depletion:

- Creatine deficiency in situations of strenuous muscle function results in fatigue, lessened muscle strength, compromised endurance, increased muscle soreness, and the need for frequent resting.
- Creatine deficiency syndrome is a genetic abnormality in children that may lead to individuals with delayed/regression, mental retardation and severe disturbances of their expressive and cognitive speech.

Food Sources:

Red meat (beef) and fish contain creatine, however, a large serving of meat provides only 1 gram of creatine. Because creatine is sensitive to heat, normal cooking preparation may result in the substantial loss of available creatine from meat and fish, particularly if the food is fully cooked.

Cautions & Side Effects:

- There is no known toxicity when using creatine as a dietary supplement.
- Creatine may cause muscle cramps or muscle breakdown, leading to muscle tears or discomfort.
- Individuals with liver or kidney disease should avoid the use of creatine supplementation.

- If you are taking prescription or non-prescription medications, are pregnant or nursing, or have a pre-existing medical condition, talk with your healthcare provider before taking any dietary supplement.
- Do not take if there is an allergy to any component of this dietary supplement.

DISCLAIMER: Statements made are for educational purposes and have not been evaluated by the US Food and Drug Administration. They are not intended to diagnose, treat, cure, or prevent any disease. If you have a medical condition or disease, please talk to your doctor prior to using the recommendations given.

References:

Exercise, strength, and muscle performance

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Neuroprotection

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Mood

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