

Creatine

Overview

Creatine is a naturally occurring amino acid (protein building block) that's found in meat and fish, and also made by the human body in the liver, kidneys, and pancreas. It is converted into creatine phosphate or phosphocreatine and stored in the muscles, where it is used for energy. During high-intensity, short-duration exercise, such as lifting weights or sprinting, phosphocreatine is converted into ATP, a major source of energy within the human body.

Creatine supplements are popular among body builders and competitive athletes. It is estimated that Americans spend roughly \$14 million per year on creatine supplements. The attraction of creatine is that it may increase lean muscle mass and enhance athletic performance, particularly during high-intensity, short-duration sports (like high jumping and weight lifting).

However, not all human studies have shown that creatine improves athletic performance. Nor does every person seem to respond the same way to creatine supplements. For example, people who tend to have naturally high stores of creatine in their muscles don't get an energy-boosting effect from extra creatine. Preliminary clinical studies also suggest that creatine's ability to increase muscle mass and strength may help fight muscle weakness associated with illnesses such as heart failure and muscular dystrophy.

Uses

Athletic performance

Most human studies have taken place in laboratories, not in people actually playing sports. Although not all clinical studies agree, some conducted in both animals and people have shown that creatine supplements improve strength and lean muscle mass during high-intensity, short-duration exercises, such as weight lifting. In these studies, the positive results were seen mainly in young people, about 20 years old.

Creatine does not seem to improve performance in exercises that requires endurance, like running, or in exercise that isn't repeated, although study results are mixed.

Although creatine is not banned by the National Collegiate Athletic Association (NCAA) or the International Olympic Committee, using it for athletic performance is controversial. The NCAA

prohibits member schools from giving creatine and other muscle building supplements to athletes, although it doesn't ban athletes from using it.

Creatine appears to be generally safe, although when it is taken at high doses there is the potential for serious side effects, such as kidney damage. High doses may also stop the body from making its own creatine.

Some creatine supplements may be marketed directly to teens, claiming to help them change their bodies without exercising. One survey conducted with college students found that teen athletes frequently exceed the recommended loading and maintenance doses of creatine. But creatine has not been tested to see whether it is safe or effective in those under 19.

Heart disease

A preliminary clinical study suggests that creatine supplements may help lower levels of triglycerides (fats in the blood) in men and women with high concentrations of triglycerides.

In a few clinical studies of people with heart failure, those who took creatine, in addition to standard medical care, were able to increase the amount of exercise they could do before becoming fatigued, compared to those who took placebo. Getting tired easily is one of the major symptoms of heart failure. One clinical study of 20 people with heart failure found that short-term creatine supplementation in addition to standard medication lead to an increase in body weight and an improvement of muscle strength.

Creatine has also been reported to help lower levels of homocysteine. Homocysteine is associated with heart disease, including heart attack and stroke.

Chronic Obstructive Pulmonary Disease (COPD)

In one double-blind study, people with COPD who took creatine increased muscle mass, muscle strength and endurance, and improved their health status compared with those who took placebo. They did not increase their exercise capacity. More studies are needed to see whether creatine has any benefit for people with COPD.

Muscular dystrophy

People who have muscular dystrophy may have less creatine in their muscle cells, which may contribute to muscle weakness. One study found that taking creatine led to a small improvement in muscle strength. However, other studies have found no effect.

Parkinson's disease

People with Parkinson's disease have decreased muscular fitness including decreased muscle mass, muscle strength, and increased fatigue. A small clinical study found that giving creatine to people with Parkinson's disease improved their exercise ability and endurance. In another clinical study, creatine supplements boosted participants' moods and they didn't need to increase their medicine dose as much as those who didn't take creatine. More research is needed in this area.

Dietary Sources

About half of the creatine in our bodies is made from other amino acids in the liver, kidney, and pancreas. The other half comes from foods we eat. Wild game is considered to be the richest source of creatine, but lean red meat and fish (particularly herring, salmon, and tuna) are also good sources.

Available Forms

Supplements are commonly sold as powders, although liquids, tablets, capsules, energy bars, fruit-flavored chews, drink mixes, and other preparations are also available.

How to Take It

Pediatric

Creatine supplements are not recommended for children or teens.

Adult

Sample doses are below. You should ask your health care provider to help you find the right dose for you.

An example of a typical loading dose in exercise performance (for adults ages 19 and older): Take 5g of creatine monohydrate, 4 times daily (20s total daily) for 2 to 5 days.

Maintenance dose in exercise performance (for adults ages 19 and older): Take 2g daily.

Your body may absorb creatine better when you take it with carbohydrate foods, such as fruits, fruit juices, and starches. The doses listed have been tested frequently in athletes. But it's not known whether these dosages have the same effects in non-athletes.

Precautions

Because of the potential for side effects and interactions with medications, dietary supplements should be taken only under the supervision of a knowledgeable health care provider.

Side effects of creatine include weight gain, muscle cramps, muscle strains and pulls, stomach upset, diarrhea, dizziness, high blood pressure, liver dysfunction, and kidney damage. Most studies have found no significant side effects at the doses used for up to 6 months.

Rhabdomyolysis (breakdown of skeletal muscle tissue) and sudden kidney failure was reported in one case involving an athlete taking more than 10 grams daily of creatine for 6 weeks. People with kidney disease, high blood pressure, or liver disease should not take creatine.

Taking creatine supplements may stop the body from making its own natural stores, although researchers don't know what the long-term effects are. The Food & Drug Administration recommends talking to your health care provider before starting to take creatine.

There have been reports of contaminated creatine supplements. Be sure to buy products made by established companies with good reputations.

Some doctors think creatine may cause an irregular heartbeat or a skin condition called purpuric dermatosis in some people, but more research is needed to know for sure.

Possible Interactions

If you are being treated with any of the following medications, you should not use creatine without first talking to your health care provider.

Non-steroidal anti-inflammatory drugs (NSAIDs) -- Taking creatine with these pain relievers may increase the risk of kidney damage. NSAIDs include ibuprofen (Motrin, Advil) and naproxen (Aleve).

Caffeine -- Caffeine may make it hard for your body to use creatine, and taking creatine and caffeine may increase risk of dehydration. Using creatine, caffeine, and ephedra (now banned in the U.S.) may increase the risk of stroke.

Diuretics (water pills) -- Taking creatine with diuretics may increase the risk of dehydration and kidney damage.

Cimetidine (Tagamet) -- Taking creatine while taking Tagamet may increase the risk of kidney damage.

Drugs that affect the kidneys -- Using creatine along with any medication that affects the kidneys may raise the risk of kidney damage.

Probenecid -- Taking creatine while taking probenecid, a drug used to treat gout, may increase the risk of kidney damage.

Source: Creatine | University of Maryland Medical Center
<http://umm.edu/health/medical/altmed/supplement/creatine#ixzz2iTwcXxAV>

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Supporting Research

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<http://umm.edu/health/medical/altmed/supplement/creatine#ixzz2iTxBKQADL>

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