



What is creatine?

Creatine is found in meat and fish taken as part of a well-balanced diet. Each pound (450 grammes) of fresh fish or red meat contains about 1 gramme of creatine. It is also available as an over-the-counter supplement, from health-food shops and large sports outlets, popular among athletes and bodybuilders as a muscle building supplement.

What does creatine do in the body?

In the body Creatine encourages the creation of a high-energy compound called phosphocreatine. Phosphocreatine serves as a quick-release energy store and is especially important in tissues such as the voluntary (skeletal) muscles and the nervous system, which periodically require large amounts of energy. Studies have shown that creatine can increase the performance of athletes in activities that require quick bursts of energy, such as sprinting, and can help these athletes to recover faster afterwards.

Where's the evidence that creatine will benefit people with MND?

Studies conducted in the USA suggested creatine may improve muscle strength and reduce muscle damage in mice with a genetically created form of MND,

Collaborative studies involving two hundred individuals then took place across the United States. Volunteers with MND were monitored over a nine month period to assess if creatine supplements

had an effect upon their muscle strength. The results of the study showed little delay in the progression of the disease for those taking creatine. However, in an alternative study dietary creatine supplements were shown to have a positive effect on muscle contraction and strength of patients across a range of neuromuscular disorders, including MND.

Does it work?

There is ambiguity surrounding creatine as an effective treatment for MND in humans. Creatine is thought to help cells that have already been damaged to keep going longer by providing the nerve cells with extra energy, or by preventing the damage from getting worse. However, an article in the journal "Amyotrophic Lateral Sclerosis," published in 2008, the authors (Qureshi et al) reported that those who took creatine showed a faster rate of decline in a measurement of arm muscle function than those who did not. The authors did not say why the people were taking the creatine, nor did they say it was responsible for this loss.

Is there evidence to say creatine has no effect?

Tests carried out on patients in a study based in Italy, suggest that as in individuals without MND, some patients with MND will respond and others will not. The effects were limited to temporary increase in muscle strength and, to a lesser degree, a reduction of fatigue, while tests carried out in Israel to assess whether creatine improve lung function in patients with MND proved negative.

MND Scotland is the working name of the Scottish Motor Neurone Disease Association, the only charity funding research and providing care and information for those affected by MND in Scotland.

Recent Creatine Clinical Trial Results

Dr Jeff Rosenfeld and colleagues, of the Carolinas Neuromuscular Centre in North Carolina, has recently (2008) published data on a clinical trial with creatine.

One hundred and seven patients were included in the study, taking either 5 grammes of creatine or a placebo (such as a sugar-pill) for nine months. The aims of the study were to determine whether long-term use of creatine is safe and to investigate whether previously reported short-term benefits of the compound could be maintained over a period of chronic illness.

The researchers wrote, "The results showed that creatine monohydrate did not significantly improve motor, respiratory or functional capacity in this patient population. The drug was well tolerated and the study groups well balanced.. There was a trend toward improved survival in patients taking daily creatine monohydrate and this was identical to the trend seen in another recently published report of creatine in ALS patients. In conclusion, creatine monohydrate (5 g/d) did not have an obvious benefit on the multiple markers of disease progression measured over nine months. We measured fatigue during isometric contraction and found no significant improvement despite anecdotal patient reports prior to and during the study. The trend toward

improved survival was also found in another recently completed blinded trial using creatine monohydrate. Further investigation on the possible survival benefit of creatine in this patient population is ongoing."

Risks and side effects

1) The kidneys can become stressed from eliminating excess creatine in the urine. It is a diuretic (increases urine output) and can cause serious dehydration. Drinking lots of water can help avoid this risk.

2) Common side effects can include stomach cramping, diarrhoea and dehydration. Drinking lots of water appears to reduce these problems. Other complications can include muscle cramping, tears, pulls and seizures. Products containing caffeine, especially drinks such as tea, coffee and energy drinks, should be avoided while taking creatine.

3) Impure products from China and other foreign countries have been found to be contaminated with baking soda or rat hairs.

Dosage

The recommended daily intake is 2 grams per day. A regime of 5 to 10 grams per day has been considered safe for people with MND. Drink lots of water throughout the day and before going to bed

Scientific Papers

Qureshi M. et al. **Medications and laboratory parameters as prognostic factors in ALS.** Amyotrophic Lateral Sclerosis, 2008, 9: 368-374

Rosenfeld J. et al. **Creatine monohydrate in ALS: Effects on strength, fatigue, respiratory status and ALSFRS** Amyotrophic Lateral Sclerosis. Amyotrophic Lateral Sclerosis, 2008; 9: 266_272

The information in this leaflet is believed to be accurate at the time of production. MND Scotland cannot give detailed medical advice, this leaflet should be regarded only as general background information.