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Health & Fitness with Whey

## Whey for Muscle & Mind

Athletic performance enhancement must be added to whey's benefits

By Ben Best

Life Extension has reported on many of the benefits of whey protein for boosting glutathione and immune function (see the issues of November 1997 and March 1998, as well as the preceding stories in this issue). But we have said little about whey's ability to build muscle in athletes. In fact, building muscle is what makes whey the biggest selling protein supplement in the world.

Muscle tissue contains 60 to 70 percent of the protein in the human body. While conventional nutritionists have denied that supplemental protein is of any help for athletes, those very athletes have continued to consume whey protein based on their own subjective experience of its value. Moreover, a growing body of scientific literature is lending support to this practice.

Protein is constructed from amino acids, and whey protein is very high in the branch-chain amino acids leucine, isoleucine and valine. Of the 20 dietary amino acids, only nine are essential (meaning they cannot be synthesized in the human body). The three branch-chain amino acids are all essential, constituting 40 percent of the minimum daily requirement of indispensable dietary amino acids.

Leucine, in particular, stimulates insulin secretion. Leucine is oxidized in humans to a far greater extent than in rats; in fact, widespread use of the rat as a model may have contributed to some of the negative thinking of nutritionists concerning the benefits of amino acids for athletes.

There also is evidence that branch-chain amino acids don't increase work capacity during exercise. Some performance improvements, however, have been seen for slow-but not fast-runners.

Whether or not branch-chain amino acids can improve immediate performance, they do seem important for building muscle. Muscle protein is particularly high in branch-chain amino acids. Leucine by itself, or even a mixture of branch-chain amino acids, is not sufficient to stimulate protein synthesis, but a mixture of protein, rich in all the essential amino acids (such as is contained in whey protein), can increase muscle synthesis by 50 percent after exercise under the influence of leucine.

The availability of amino acids immediately after exercise seems to be of the greatest importance for muscle development. One scientific review of the literature suggests that recommended daily allowances of protein should be increased 50 to 100 percent for people who exercise regularly, and that optimal intakes may be even higher.

Even if physical work capacity during exercise is not much improved by branch-chain amino acids, those same amino acids have produced 15 percent lower ratings of mental fatigue. Fewer branch-chain amino acids enter the brain during exercise through the large neutral amino acid carrier. Therefore, the carrier transports larger amounts of the amino acid tryptophan, leading to more brain serotonin synthesis and, hence, more mental fatigue.

However, performance on Stroop's Color Word Test—a measurement of perception and cognition—immediately after exercise showed improvement in subjects who had been given branch-chain amino acids during exercise.

The capacity of whey protein (and branch-chain amino acids) to prevent muscle degeneration in patients suffering from wasting diseases has caught the attention of the medical community. Whey protein or branch-chain amino acid infusions are recommended for cancer, accident and burn victims, patients with sepsis, and patients who have recently had surgery. For related reasons, whey is of value in preventing the loss of lean tissue in people who are starving, fasting or dieting.

The capacity of whey to improve immune function, increase the antioxidant glutathione and perhaps extend life span are probably the most important reasons why a life extensionist would take whey protein as a dietary supplement. However, as is clear from the

research, whey can also play an important role in maintaining muscle tissue in a program of exercise or caloric restriction with adequate nutrition.

## Further Reading

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