

# Abstract

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## **Dietary omega-3 fatty acid supplementation increases the rate of muscle protein synthesis in older adults: a randomized controlled trial.**

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**BACKGROUND:** Loss of muscle mass with aging is a major public health concern. Omega-3 (n-3) fatty acids stimulate protein anabolism in animals and might therefore be useful for the treatment of sarcopenia. However, the effect of omega-3 fatty acids on human protein metabolism is unknown.

**OBJECTIVE:** The objective of this study was to evaluate the effect of omega-3 fatty acid supplementation on the rate of muscle protein synthesis in older adults.

**DESIGN:** Sixteen healthy, older adults were randomly assigned to receive either omega-3 fatty acids or corn oil for 8 wk. The rate of muscle protein synthesis and the phosphorylation of key elements of the anabolic signaling pathway were evaluated before and after supplementation during basal, postabsorptive conditions and during a hyperaminoacidemic-hyperinsulinemic clamp.

**RESULTS:** Corn oil supplementation had no effect on the muscle protein synthesis rate and the extent of anabolic signaling element phosphorylation in muscle. Omega-3 fatty acid supplementation had no effect on the basal rate of muscle protein synthesis (mean  $\pm$  SEM:  $0.051 \pm 0.005\%/h$  compared with  $0.053 \pm 0.008\%/h$  before and after supplementation, respectively;  $P = 0.80$ ) but augmented the hyperaminoacidemia-hyperinsulinemia-induced increase in the rate of muscle protein synthesis (from  $0.009 \pm 0.005\%/h$  above basal values to  $0.031 \pm 0.003\%/h$  above basal values;  $P < 0.01$ ), which was accompanied by greater increases in muscle mTOR(Ser2448) ( $P = 0.08$ ) and p70s6k(Thr389) ( $P < 0.01$ ) phosphorylation.

**CONCLUSION:** Omega-3 fatty acids stimulate muscle protein synthesis in older adults and may be useful for the prevention and treatment of sarcopenia. This trial was registered at clinical trials.gov as NCT00794079.

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