

DATA SET GROUP A

EXPLORE 2 LESSON 27



Study 1

Consumption of Milk Protein or Whey Protein Results in a Similar Increase in Muscle Protein Synthesis in Middle Aged Men

Publish Date: 2015

Journal: Nutrients

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Link: <https://www.mdpi.com/2072-6643/7/10/5420>

Overview of the Study

In this study, scientists wanted to figure out which type of protein drink is better for helping muscles grow: whole milk protein or whey protein. To carry out this investigation, they recruited 16 healthy middle-aged men into the study.

Participants arrived fasted to the lab at 07:00. A muscle biopsy (100 mg) was obtained from the vastus lateralis muscle with a Bergström needle modified for manual suction under local anesthesia (2% xylocaine). Visible fat and connective tissue was dissected away from the biopsy and it was immediately frozen in liquid nitrogen.

After two hours of rest, a second biopsy was obtained from the contralateral leg. Participants then consumed one of two study beverages within 5 min. Additional biopsies were obtained at 90 min and 210 min after ingestion of the drink.

Participants were randomly assigned to consume either 20 g of Milk Protein Concentrate (MPC) or 20 g of Whey Protein Concentrate (WPC). The scientists then analyzed the biopsied muscle tissue to measure how fast the muscle tissue was using amino acids to build additional new muscle cells and tissues. This measurement was called the Fractional Synthetic Rate (FSR).



Results

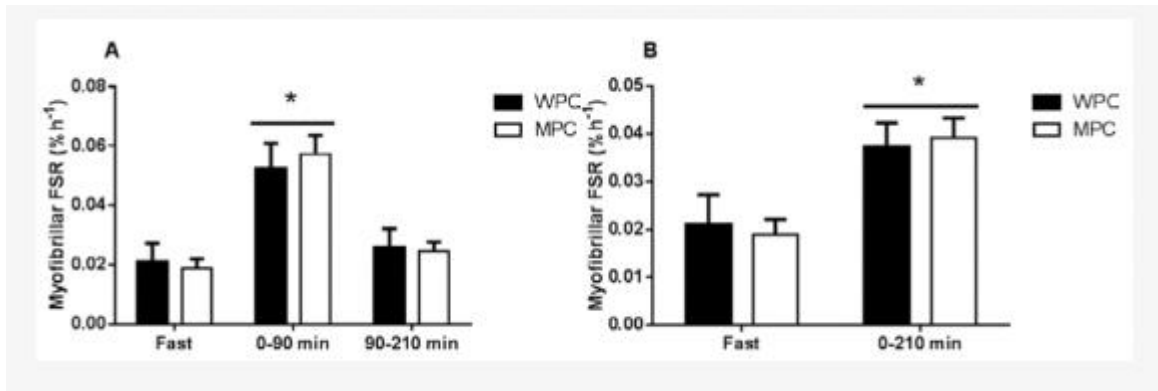


Figure 1 Muscle fractional synthetic rate (FSR). A) The course of myofibrillar protein synthesis following the ingestion of 20 g of MPC (open bars) or WPC (black bars). B) The aggregate myofibrillar protein synthesis following the ingestion of 20 g of MPC (open bars) or WPC (black bars). The solid horizontal line represents a main effect for time. *, different from fast $p \leq 0.05$. Error bars represent the standard error of the mean.

Study 2

Sex-based comparisons of myofibrillar protein synthesis after resistance exercise in the fed state

Publish Date: 2012

Journal: Journal of Applied Physiology

Authors: Daniel W. D. West, Nicholas A. Burd, Tyler A. Churchward-Venne, Donny M. Camera, Cameron J. Mitchell, Steven K. Baker, John A. Hawley, Vernon G. Coffey, and Stuart M. Phillips

Link: <https://journals.physiology.org/doi/full/10.1152/jappphysiol.00170.2012>

Overview of the Study

In this study, researchers compared differences in muscle protein synthesis (MPS) and anabolic signaling in men and women who engaged in high-intensity exercise. Eight men and eight women completed an intense exercise session consisting of 5 sets of 10 repetitions of leg press at 90% of their 10 repetition maximum and three sets of 12 repetitions of leg extension and leg curls supersets (1 set of each exercise, back-to-back with no rest between sets) at 90% of their 12 repetition maximum. After exercise completion, participants consumed a drink containing 25 g of whey protein and rested for the remainder of the trial.

Muscle biopsies of the thigh muscle were obtained prior to exercise and at 1, 3, and 5 hours post-exercise. Participants consumed another 25 g of whey protein 24 hours after exercise, and the scientists took additional muscle biopsies at 24, 26, and 28 hours postexercise. The scientists then took the muscle biopsies and measured how fast the muscle tissues were using amino acids to build additional new muscle cells and tissues. This measurement was called the Fractional Synthetic Rate (FSR)

Results

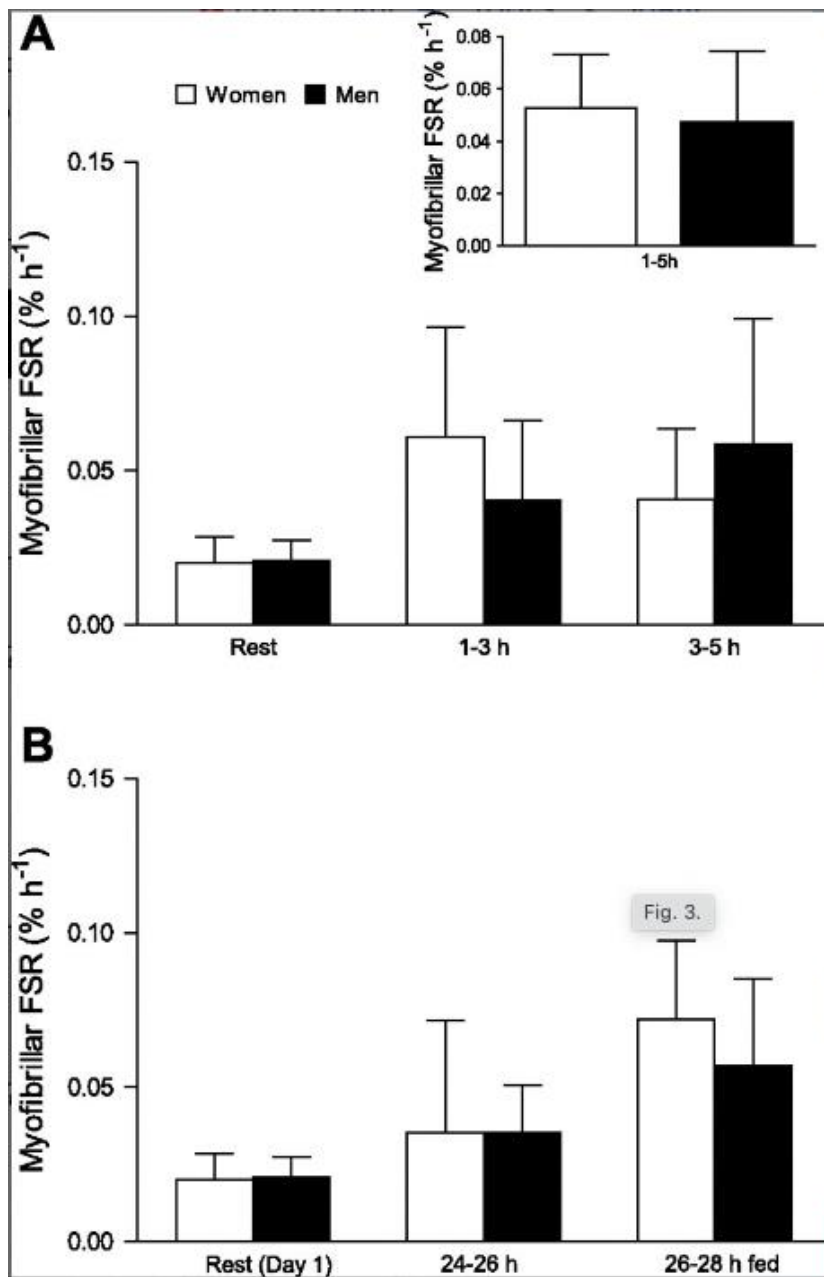


Figure 2 Myofibrillar fractional synthetic rates (FSR) in the rested fasted state, 1–3 and 3–5 h after resistance exercise and protein ingestion (A). Myofibrillar FSR 24–26 h postexercise and 26–28 h post-exercise after 25 g of protein ingested at 26 h (B). *Inset* in A is the aggregate FSR from 1–5 h calculated from enrichments obtained from biopsies taken at 1 and 5 h. 1–3 h and 3–5 h > rest, $P < 0.001$; sex \times time interaction, $P = 0.087$. The rested fasted rate from *day 1* A is simply redrawn in B for comparison's sake. 26–28 h > 24–26 h, $P < 0.001$; sex \times time interaction, $P = 0.56$. Values are means \pm SD, $n = 8$ in each group.