

**Are dietary protein supplements really necessary to promote muscle gains in conjunction with resistance exercise?**

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- Used for building and repairing muscles, red blood cells, hair, and other tissues
- Protein can come from several different dietary sources or from supplements
  - Complete contain 9 essential amino acids
    - meat, fish, poultry, eggs and milk products
  - Incomplete lack essential amino acids
    - beans, peas, nuts, seeds and grains

**Protein**

- Recommended amount: 0.8 – 1.8 g/kg body weight per day
- Athletes need greater amounts of calories (protein)
- Extra protein not utilized by the body is burned for energy or stored as fat.
  - Possibly other side effects

**Protein**

## Nutrition and Sports Supplements

Lawrence & Kirby, *Journal of Clinical Gastroenterology*, 2002

Investigated the effects of dietary intake of protein on strength and body composition in untrained and trained men in a randomized, double-blind crossover study. Six sedentary and seven resistance-trained athletes ingested 0.86, 1.4, and 2.4 g/kg/day of protein for 13 days separated by an 8 day washout period. Resistance-trained athletes had a greater daily requirement for protein (1.4 g/kg/day). However, increased protein intake did not affect changes in fat-free mass in either group. These findings suggest that resistance-trained athletes may need between 1.7 to 1.8 g/kg/day of protein in order to ensure nitrogen balance but that ingesting protein above this level does not promote muscle growth.

**Research**

## **Protein requirements and muscle mass/strength changes during intensive training in novice bodybuilders.**

Lemon, Tarnopolsky, MacDougall JD, et al. J Appl Physiol 2002

Investigated the effects of protein supplementation on body composition and strength alterations in a group of novice bodybuilders. In a repeated measures crossover design, 12 male bodybuilders randomly ingested 1.35 or 2.62 g/kg/day of protein while consuming a 3500 Cal/day diet. Participants trained for 4 weeks, observed a 7 day washout period, and then repeated the experiment with the alternate protein intake. There were no significant differences observed between groups in gains in body mass, muscle mass (determined by density, creatinine excretion, and computerised axial tomography), or strength.

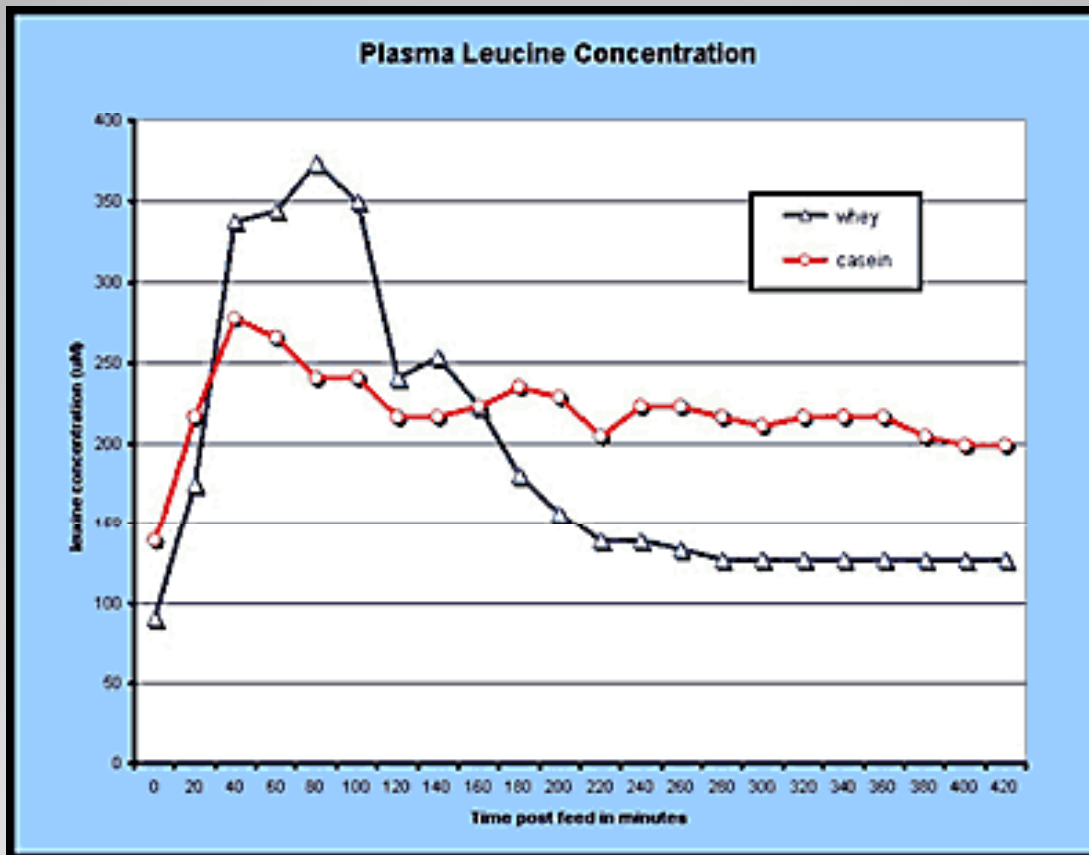
**Research**

## **Effect of dietary supplements on lean mass and strength gains with resistance exercise: a meta-analysis.**

Nissen & Sharp, *Journal of Applied Physiology*, 2003

Evaluated the effects of protein ingestion on protein balance after resistance training. Twenty-three subjects consumed one of three drinks (placebo, 20 grams of casein protein, or 20 grams of whey protein), one hour after a bout of leg extensions. The results indicated that ingestion of whey and casein protein after resistance exercise increases net muscle protein synthesis, at varied rates.

## **Protein Timing**



(Nissen & Sharp, 2003)

# Ketogenic diets and physical performance

Stephen Phinney *Nutritional Metabolism* 2004

Randomized crossover study of 45 male non-athletes consuming a diet in which protein made up more than 30% of caloric intake. Subjects' were randomly selected to exercise at high intensity using a modified Bruce protocol. Glomerular filtration ability was examined in both groups pre- and post- activity, and results showed that the high protein consumption caused a buildup of toxic ketones. The ketogenic diet caused hyperfiltration in kidneys, in order to flush ketones from the body, causing a significant loss of water and placing subjects at risk for dehydration (effect was increased when subjects engaged in heavy exercise).

## Side Effects



**TABLE 6.8** Costs of protein found in various food sources

Source	Serving size	Grams of protein/serving	Cost per serving	Cost per 8 grams of protein
Powdered milk	23 grams	8	\$0.13	\$0.13
Egg	1	6	\$0.10	\$0.13
Turkey breast	4 ounces	28	\$0.75	\$0.21
Skim milk	8 fluid ounces	8	\$0.20	\$0.20
Protein capsules	8 capsules	8	\$1.20	\$1.20
MetRx Bar	3.5-ounce bar	27	\$2.50	\$0.74
Boost	8 fluid ounces	10	\$1.10	\$0.88
Avalanche Power Drink	16 fluid ounces	40	\$3.00	\$0.60
Whey Pro	1 scoop	23	\$1.01	\$0.34

(Williams, 2006)

- Importance of maintaining a well balanced, nutrient dense, energy balanced diet during resistance training as well as rationale, effectiveness and potential adverse effects of dietary supplements.

# Reference

- Chromiak, J.A., Smedley, B., Carpenter, W., et al. (2004). Effect of a 10-week strength training program and recovery drink on body composition, muscular strength and endurance, and anaerobic power and capacity. *Nutrition*, 20, 420-427.
- Kreider RB. (1999) Dietary supplements and the promotion of muscle growth with resistance exercise. *Sports Med*, 27(2): 97-110.
- Lawrence, M.E., & Kirby, D.F. (2002). Nutrition and Sports Supplements. *Journal of Clinical Gastroenterology*, 35, 299-306.
- Lemon PW, Tarnopolsky MA, MacDougall JD, et al. (2002) Protein requirements and muscle mass/strength changes during intensive training in novice bodybuilders. *J Appl Physiol*; 73: 767-75.
- Nissen, S.L., & Sharp, R.L. (2003). Effect of dietary supplements on lean mass and strength gains with resistance exercise: a meta-analysis. *Journal of Applied Physiology*, 94, 651-659.
- Phinney, S.D. (2004) Ketogenic diets and physical performance. *Nutr Metab*, 1(2).
- Williams, K. (2006) Nutrition for Health, Fitness and Sport. McGraw Hill; NY, 321.