WHEY PROTEIN

Research Overview: Benefits of Protein

Dietary protein is critical to help build and maintain muscle mass because it provides us with important amino acids. However, not all proteins are created equal. It is important to include high-quality protein as a part of your daily diet because it contains all of the essential amino acids the body needs to build proteins, which helps our bodies function properly. Whey protein, an easily digested, rapidly absorbed high-quality protein that is naturally found in dairy, is a great choice to help achieve a higher protein diet. Studies show that consuming a higher protein diet can help a person maintain a healthy weight, curb hunger, build and maintain lean muscle, enhance exercise recovery and reduce muscle loss. Below are summaries of select studies and reports that examined the health benefits of protein and whey protein.

A HIGHER PROTEIN DIET CAN HELP A PERSON:

- Maintain a Healthy Weight
- Curb Hunger
- Build Lean Muscle
- Enhance Recovery
- Reduce Muscle loss

Maintain a Healthy Weight

Dietary Protein, Weight Loss, and Weight Maintenance

Summary: This review deals with the effects of relatively high-protein diets during energy balance, weight loss, and weight maintenance thereafter on specific metabolic targets: satiety, energy expenditure, protein and amino acid metabolism, and gluconeogenesis. Effects on body weight and body composition are highlighted, and potential risks of high-protein diets are discussed. **Dietary protein aids in body weight regulation through its ability to increase satiety, thermogenesis and energy efficiency, and improve body composition.** Protein-induced satiety may be mainly due to oxidation of amino acids fed in excess. Protein-induced energy expenditure may be due to protein and urea synthesis and to gluconeogenesis; "complete" proteins having all essential amino acids show larger increases in energy expenditure than do lower-quality proteins.[i]

Curb Hunger

Macronutrients and healthful diets. Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids

Summary: In a section of this report addressing macronutrients and healthful diets, the Institute of Medicine reviewed several short-term studies and concluded that **protein intake has a more powerful effect on satiety than either carbohydrate or fat.**[ii]

Associations between macronutrient intake and self-reported appetite and fasting levels of appetite hormones: results from the optimal macronutrient intake trial to prevent heart disease

Summary: This randomized, crossover, controlled feeding study compared consumption of high-protein (48% carbohydrate, 25% protein, 27% fat), high-carbohydrate (58% carbohydrate, 15% protein, 27% fat) and high-fat (48% carbohydrate, 15% protein, 37% fat) diets for six weeks and their relationship to satiety. Participants were men and women 30 years of age or older and had pre-hypertension or stage 1 hypertension. Participants' rating of appetite was 14% greater before meals when they were assigned to the high-carbohydrate and high-fat diets compared to the high-protein diet. The authors conclude that **in order to reduce appetite, people should consume a healthy diet rich in protein.**[iii]

i Westerterp-Plantanga et al. Annu Rev Nutr. 2009;29:11.1-11.21.

ii Institute of Medicine, Panel on Macronutrients and Standing Committee on the Scientific Evaluation of Dietary Reference Intakes. Washington, DC: National Academies Press, 2002/2005, ch 11, p 843.

iii Beasley et al. AM J Epidemiol. 2009;169(7):893-900.

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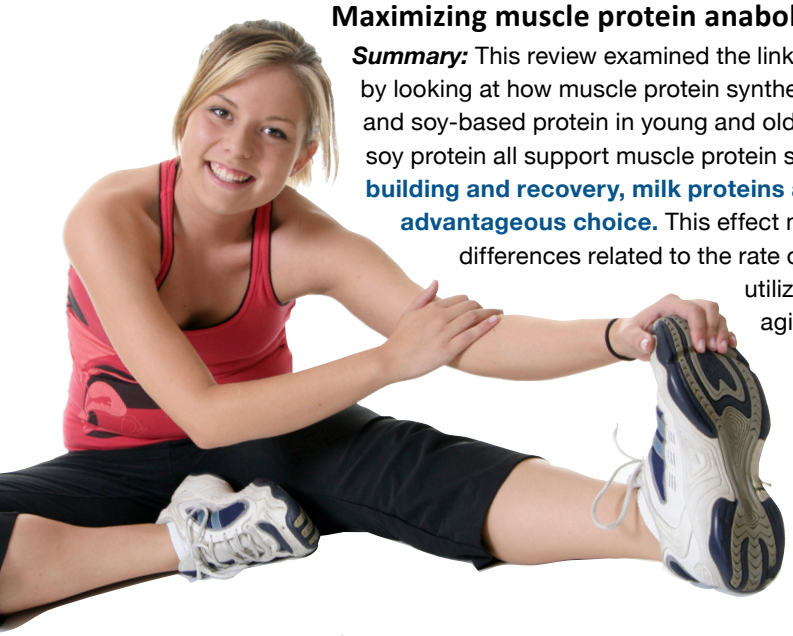
Build Lean Muscle



Maximizing muscle protein anabolism: the role of protein quality

Summary: This review examined the link between dietary protein quality and muscle protein balance by looking at how muscle protein synthesis and breakdown differs following intake of milk-based and soy-based protein in young and older persons. Research suggests that milk, whey, casein and soy protein all support muscle protein synthesis; however, **when seeking to maximize muscle building and recovery, milk proteins and their isolated forms (whey and casein) may be an advantageous choice.** This effect may be due to the leucine content of milk proteins and/or differences related to the rate of digestion that impact postprandial protein metabolism and utilization. This may be of particular importance to the aging population. [iv]

Ingestion of whey hydrolysate, casein, or soy protein isolate: effects on mixed muscle protein synthesis at rest and following resistance exercise in young men

Summary: This study assessed muscle protein synthesis (MPS) following the ingestion of rapidly (i.e., whey hydrolysate and soy isolate) and slowly (i.e., micellar casein) digested proteins at rest and after resistance exercise. Healthy young men performed a bout of resistance exercise followed by the consumption of a drink containing an equivalent content of essential amino acids (10g) as either whey hydrolysate, micellar casein, or soy protein isolate. Stimulation of MPS was greater after whey hydrolysate and soy protein consumption compared to casein both at rest and after resistance exercise. The whey hydrolysate stimulated MPS to a greater degree than soy after resistance exercise, possibly due to how quickly the proteins are digested or to small differences in leucine content. These findings provide evidence for differentiation between how whey, casein and soy proteins impact blood essential amino acid concentrations and MPS rates. Whey and soy proteins have a clear advantage over casein in their ability to increase MPS at rest. **The data also support a benefit of post-resistance exercise consumption of whey protein over soy protein and casein for increasing MPS.** [v]

iv Tang and Phillips. Curr Opin Clin Nutr Metab Care. 2009;12:66-71.
v Tang et al. J Appl Physiol. 2009;107:987-992.

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Enhance Recovery

Influence of carbohydrate-protein beverage on cycling endurance and indices of muscle disruption

Summary: This randomized, crossover study examined the impact of a carbohydrate-protein beverage (CHO+Pro) consumed every 15 minutes during cycling on time to exhaustion, markers of muscle disruption, and subsequent muscle function compared to a placebo (PLA), and carbohydrate beverages matched for carbohydrate (CHO) or total calories (CHO-CHO) in a group of 12 trained male cyclists. Blood samples were taken before and after each ride to determine changes in markers of muscle disruption [serum myoglobin (Mb) levels and plasma creatine kinase (CK) levels]. A muscle-function test (leg extensions at 70% 1-Repetition Maximum) and ratings of muscle soreness were determined ~24 h after each trial. Participants rode significantly longer in the CHO+Pro (18%) and CHO-CHO (13%) trials compared to PLA. Markers of muscle disruption post-exercise were lower for the CHO+Pro compared to all other groups. Post-exercise leg extensions at 70% 1-RM were significantly greater for CHO+Pro compared to CHO-CHO, CHO, and PLA. While post-exercise muscle soreness did not differ across trials, **the improved muscle function and the attenuated rise in CK and Mb after CHO+Pro ingestion may have practical implications for performance in subsequent exercise.** This might be most beneficial to athletes who engage in very hard, long, or frequent exercise.[vi]

Reduce Muscle Loss

Dietary protein recommendations and the prevention of sarcopenia

Summary: The review highlights that in addition to total protein intake (g/d), the amount of protein consumed at each meal is another critical factor to consider when developing dietary recommendations for older persons to aid in the prevention or slowing of age related muscle loss (sarcopenia). Specifically, **research supports the consumption of 25-30 grams of protein at each meal to maximally stimulate muscle protein synthesis in this population.** Consuming protein in amounts less than 20 g per meal or with carbohydrates has been shown to blunt the process of muscle protein synthesis which over time, may contribute to greater loss of muscle in older adults.[vii]

Dietary protein intake is associated with lean mass change in older, community-dwelling adults: the health, aging, and body composition (Health ABC) study

Summary: This longitudinal study examined the association between dietary protein intake and changes in lean body mass over a 3-year period in a group of men and women aged 70-79 years. After adjusting for total energy intake, protein intake was associated with changes in lean body mass. Specifically, adults in the highest quintile of protein intake (median of 1.1 g protein/kg body weight/d) lost approximately 40% less lean mass compared to adults in the lowest quintile of protein intake (0.7 g protein/kg body weight/d) (0.5 kg compared to 0.9 kg lean mass respectively). These results suggest that consuming low amounts of protein may be a risk factor for increased muscle loss (sarcopenia) in older adults, **while a higher protein diet may help preserve muscle mass as we age.**[viii]

vi Valentine et al. Int J Sport Nutr Exerc Metab. 2008;18(4):363-378.
vii Paddon-Jones and Rasmussen. Curr Opin Clin Nutr Metab Care. 2009;12:86-90.
viii Houston et al. AM J Clin Nutr. 2008;87:150-155.

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