



## Building Muscle

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Contributing Editor

**B**uilding muscle is important to more than just athletes. Weekend warriors, the elderly, children and even those trying to drop a few pounds benefit from additional muscle mass.

### Who needs to build muscle?

When it comes to building muscle, many people think of athletes, who rely on their muscle function, mass and strength to perform. However, muscle is important for everyone throughout the lifespan. According to Doug Paddon-Jones, associate professor, Department of Nutrition and Metabolism, The University of Texas Medical Branch, Galveston, TX: "The need to build and repair muscle mass affects all adults and doesn't change dramatically with age. Therefore, it is important to establish good eating habits early on."

In addition to athletic performance, muscle is vital for engaging in activities of daily living, it serves as an amino-acid reservoir to help maintain protein synthesis during times of need (fasting, critical illness), increases resting energy expenditure, thereby playing a role in weight management, and plays a key role in the prevention of sarcopenia and the frailty that accompanies this disease (*The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, 1995; 505-508; *American Journal of Clinical Nutrition*, 2006; 84:475-482). Muscle also is responsible for

the largest voluntary load on bone tissue, a process essential to bone modeling and remodeling.

### Protein and amino-acid requirements

As indicated in the Dietary Reference Intakes, the RDA of 0.8 grams of good quality protein per kg body weight per day covers protein requirements, including a minimal protein intake to cover any losses. However, studies show we need more protein to build muscle mass (*Journal of the International Society of Sports Nutrition*, 2007; 4:8). Therefore, according to Stuart Phillips, professor and associate chair of graduate studies, Department of Kinesiology, McMaster University, Hamilton, Ontario, "The more important question to ask is whether there is an optimal or advantageous protein intake, and in that case I'd say yes, and it's likely in the range of 1.2 to 1.7 grams/kg per day; any more is not better and simply doesn't confer any further advantage."


In addition to consuming an optimal amount of protein each day, the distribution and quality of protein consumed is important. "The RDA isn't optimal and may be somewhat misleading because it doesn't address how we distribute protein across the day," says Paddon-Jones. "Ideally, we should provide a meal-driven protein recommendation based on a moderate amount of protein, approximately 25 to 30 grams, three times per day to maximize the potential for muscle growth and repair." More than 30 grams of protein in a meal

does not further enhance muscle-protein synthesis in healthy young and elderly individuals (*Journal of the American Dietetic Association*, 2009; 109:1,582-1,586). Consuming protein throughout the day is also beneficial for dieters because it enhances satiety and minimizes muscle-mass loss during weight loss (*The Journals of Gerontology Series A: Biological Sciences and Medical Sciences*, July 27, 2011).

In addition to consuming protein at each main meal, it is also critical to consume protein within 30 to 45 minutes before and/or less than two hours after resistance training in the young, and less than one hour after exercise in the elderly. Exercise, particularly weight or resistance training, increases both muscle growth and muscle breakdown. For muscle growth to exceed muscle breakdown, a dose of 10 grams of essential amino acids (the amount in approximately 25 grams of whey or casein, or 20 grams of egg protein) is necessary (*Journal of the American College of Nutrition*, 2009; 28:343-354).

And finally, protein quality is important. The quality of a protein reflects its ability to provide the nitrogen

and amino-acid requirements for growth, maintenance and repair. Protein quality is therefore determined by its digestibility and amino-acid composition. “Whey protein appears to enjoy a position of superiority in terms of being the optimal protein for building muscle mass,” says Phillips. “This is likely because of its high leucine and other branched-chain amino-acid content, as well as the rapid digestibility of the protein. This results in a rapid amino-acidemia/leucinemia, and this appears to be critical for stimulating new muscle-protein synthesis.”

In addition, “eggs, some protein powders and Greek yogurt are also excellent choices for adding protein to breakfast—a meal that is often protein-poor for a number of Americans,” notes Paddon-Jones. 

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