

Protein To Build and Repair Muscles

Traditionally, protein-rich foods have been synonymous with muscular athletes. The (misguided) theory is that if you eat a lot of protein, you will build a lot of muscle. The truth is that heavy weightlifting, push-ups, and other forms of resistance exercise—not excess protein—build and strengthen muscles. If you consume more protein than you need, you will simply burn more protein as a fuel source (Bolster et al. 2005).

Confusion exists about the best diet for building muscles. When you work out in the weight room at the gym, you likely hear you need to consume lots of chicken breasts and egg whites and drink protein shakes between meals to be stronger. But when you hang around in the cardio area, you hear that carbohydrate-rich pasta, cereal, and grains should be the foundation of your meals. And you are left wondering, what's the right balance?

Carbohydrate-rich grains, fruits, and vegetables are indeed the best foundation for every type of training program. Even bodybuilders need a carbohydrate-based diet because carbohydrate is stored in the muscles for energy. You can't lift weights and demand a lot from your workout sessions if your muscles are carbohydrate depleted. Protein-based diets low in carbohydrate provide inadequate muscle fuel for you to exercise hard enough to build to your potential.

The best sports diet contains adequate, but not excessive, protein to build and repair muscle tissue, grow hair and fingernails, produce

hormones, boost your immune system, and replace red blood cells. Most people who eat moderate portions of protein-rich foods daily get more protein than they need. Any excess protein is burned for energy or, as a last resort, stored as glycogen or fat. Humans do not store excess protein as muscle, protein, or amino acids, so we need to consume adequate protein each day. Daily protein is particularly important for dieters who are restricting calories, because protein is burned for energy when carbohydrate and calories are scarce.

When it comes to protein intake, athletes seem to fall into two categories. First are those who eat too much—the bodybuilders, weightlifters, and football players who can't seem to get enough of the stuff. Those in the second group eat too little—the runners, dancers, and weight-conscious athletes who never touch meat and trade most protein calories for more salads and vegetables. Individuals in either group can perform poorly because of dietary imbalances.

Josh, for example, was a protein pusher. A college hockey player, he routinely snacked after practice on a big protein bar and a protein shake. That one snack satisfied more than half his protein needs for the whole day. As an athlete, he has a slightly higher protein need than a sedentary person, but he overcompensated for that need with the generous servings of chicken and fish he devoured at meals, never mind his high-protein snack.

Paulo, a vegetarian marathon runner who ate spaghetti with tomato sauce seven nights a week, downplayed his need for protein. "Most Americans get way too much protein; I'm sure I get plenty, too." He consumed few protein-rich foods of any types—plant or animal products. He was humbled when he learned that his food intake was deficient not only in protein but also in iron (for red blood cells), zinc (for healing), calcium (for bones), and several other nutrients. No wonder he became anemic, suffered a lingering cold and flu, and performed poorly despite consistent training.

Defining Protein Needs

Research has yet to define the exact protein requirements of sports-active people because individual needs vary. People in the following groups have the highest protein needs:

- **Endurance athletes and others doing intense exercise.** About 5 percent of energy can come from protein during endurance exercise, particularly if muscle glycogen stores are depleted and blood glucose is low.

- **Dieters consuming too few calories.** The protein is converted into glucose and burned for energy instead of being used to build and repair muscles.
- **Growing teenage athletes.** Protein is essential for both growth and muscular development.
- **Untrained people starting an exercise program.** They need extra protein to build muscles.

In scrutinizing the protein needs of athletes, exercise scientists have found that athletes need slightly more protein than other people do to repair the small amounts of muscle damage that occur with training, to provide energy (in very small amounts) for exercise, and to support the building of new muscle tissue.

In general, pinpointing exact protein requirements is almost a moot point because many athletes eat more protein than they require just through standard meals. That is, a 150-pound (68 kg) recreational athlete who burns 3,000 calories can easily consume 300 to 450 protein calories, or 75 to 112 grams of protein. This equates to 0.5 to 0.7 gram of protein per pound (1 to 1.5 g of protein per kg), which is more than the RDA of 0.4 gram per pound (0.8 g per kg).

Table 7.1 provides safe and adequate recommendations for protein intake for a range of individuals. These recommendations include a margin of safety and are not minimal amounts. If you are overfat, base your protein needs on your ideal body weight.

In contrast to the belief that a little more protein is good so a lot more will be better, no scientific evidence to date suggests that protein intakes exceeding 0.9 gram of protein per pound (2.0 g per kg) will provide an additional advantage (Lemon 1995). Nor is there evidence that taking a protein supplement on top of an adequate diet (with about 0.5 g of protein per pound, or 1 g per kg) will enhance muscle strength or size (Godard, Williamson, and Trappe 2002). And don't fret about how the protein is packaged—as whey powder, chicken, egg whites, or chocolate milk; all protein can build muscles. The advantage of getting protein from natural foods (as opposed to supplements) is that natural foods contain protein the way nature intended as well as yet-unknown bioactive compounds that might influence muscle growth.

The physiques of bodybuilders are not attributable to the excessively high protein diet they commonly consume but rather to their intense training. Bodybuilders work incredibly hard. They prefer a high-protein diet because protein not only builds and protects their muscles but also keeps them from feeling hungry when they are cutting calories—lean protein is harder to overconsume.

Table 7.1 Protein Recommendations

Type of individual	Grams of protein per body weight pound	Grams of protein per body weight kilogram
Sedentary adult	0.4	0.8
Recreational exerciser, adult	0.5-0.7	1.0-1.5
Endurance athlete, adult	0.6-0.7	1.2-1.6
Growing teenage athlete	0.7-0.9	1.5-2.0
Adult building muscle mass	0.7-0.8	1.5-1.7
Athlete restricting calories	0.8-0.9	1.8-2.0
Estimated upper requirement for adults	0.9	2.0
Average protein intake of male endurance athletes	0.5-0.9	1.1-2.0
Average protein intake of female endurance athletes	0.5-0.8	1.1-1.8

Data compiled from American College of Sports Medicine, American Dietetic Association, and Dietitians of Canada Joint Position Statement. Nutrition and Athletic Performance. *Medicine and Science in Sports and Exercise* 32 (12): 2130-2145, 2000; R. Maughan and L. Burke, editors. *Sports Nutrition* (part of the Handbook of Sports Medicine and Science series, an IOC Medical Commission Publication) Malden, MA: Blackwell Publishing, 2002; Institute of Medicine. *Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids*. Food and Nutrition Board, Washington, DC: National Academy Press, 2002.

Your Protein Needs

To learn if you are meeting your protein needs in your current diet, follow two easy steps. First, using table 7.1, identify which category you belong to. For example, if you are a 140-pound (64 kg) bike racer, you would fit the category of an “endurance athlete, adult” and would need about 85 to 100 grams of protein per day:

$$140 \text{ lb} \times 0.6 \text{ g/lb} = 84 \text{ g protein}$$

$$140 \text{ lb} \times 0.7 \text{ g/lb} = 98 \text{ g protein}$$

Second, keep track of your protein intake by listing everything you eat and drink for one 24-hour period. The information on food labels provides protein information, and table 7.2 lists the amount of protein in some common foods. You can also use a variety of Web sites (see Dietary Analysis in appendix A) to analyze your diet and assess your protein intake. Note that you need to eat a generous portion (more calories) of beans and other forms of plant protein to equal the protein in animal foods. Most fruits and vegetables have only small amounts of protein, which may contribute a total of 5 to 10 grams of protein per day, depending on