



THE COMPLETE GUIDE TO PROTEIN

BY HOBART SWAN | MAY 27, 2021

Lifters and athletes have been preaching the gospel of protein for decades, and the rest of the world has been catching up in the last few years. Today, it's common to see protein products being sold pretty much everywhere, and to hear everyone from your grandma to your teenage nephew talking about trying to get more of it in their diet.

Here's everything you've been asking us, and everyone else on the internet, about the mightiest of macronutrients. If you're a serious lifter or athlete, are chasing gains or weight loss, or are just trying to eat healthier, this is where the conversation starts!

WHAT IS PROTEIN?

It isn't just part of what's on your plate or in your shaker bottle. It's a major part of who you are, and the same goes for every other living thing. Proteins have existed on earth for billions of

years and are the primary building blocks of most forms of life, from the simplest bacteria to the most sophisticated life forms.

In fact, it isn't really a thing, as much as it is a category of things. There are millions of different types of protein molecules, all containing different combinations of 20 standard amino

acids. But proteins are also by far the most complicated molecules in the human body, and can contain anywhere from 50-2,000 amino acids including the essential 20. To date, about 10,000 different proteins have been identified in the human genome. There are thought to be nearly one trillion different variations on earth. [1]

The body of a 154-pound man contains about 24 pounds of protein. Almost half is in the form of skeletal muscle, with another 3-4 pounds in the form of skin and blood. Bone and organs make up the rest. [2]

In nutritional terms, protein is one of the three primary macronutrients our bodies need to survive. It is a "macro" nutrient because, like carbohydrates and fats, we consume a significant amount of it and use it for fuel. We need a comparatively small amount of vitamins and minerals every day, so they are referred to as "micronutrients."

Protein is contained in various combinations and quantities in every food we eat-even vegetables. Unlike all these other macro and micronutrients, your body can't store it, so you have to get it consistently through the foods you eat, and/or the supplements you take.

WHAT DO OUR BODIES USE PROTEIN FOR?

It plays a role in virtually everything that goes on in your body. In your blood, it transports oxygen throughout your body. It builds and repairs tissue (including muscle tissue) and makes enzymes, hormones, and other body chemicals. It is also a fundamental building block of bones, cartilage, organs, skin, blood, hair, and nails.

The antibodies our bodies use to ward off disease and infection are made of protein, as are the enzymes that read the genetic information in our DNA to make new molecules. Messenger protein molecules transmit signals between cells, tissue, and organs, and transport protein molecules carry atoms and small molecules throughout the body.

WHAT ARE THE BENEFITS OF DIETARY PROTEIN?

You probably associate high-protein eating with people trying to gain mass. And that's because it works! Diets that are rich in high-protein foods, in combination with resistance training, have been shown repeatedly to help athletes add or retain lean mass.

However, diets that include moderate or high-protein foods have plenty of other advantages. For one, as Jose Antonio, Ph.D., writes in the article "3 Myths about High-Protein Diets Debunked," "It's very difficult to get fat if the only thing you overfeed on is protein."

Most high-protein foods are themselves very low in fat and carbs. Chicken breasts have 2-3 grams of fat per serving, while cottage cheese has only 1-2 grams. Egg whites and fish are virtually fat-free, and in the case of fish, the fats they contain are often healthy omega-3 fatty acids.

High-protein diets can also help you lose unwanted weight. "Not only will this extra protein help you build more lean muscle mass, but it will also diminish your appetite, making you less apt to cave in to cravings," says Jose Antonio, Ph.D. "[It] can help you lose weight because of its ability to act as a potent

thermogenic agent. That means your body burns more calories digesting protein foods than it takes to digest an identical amount of carbohydrate and fat."

HOW MUCH PROTEIN DO I NEED?

The short answer: More than a food label will tell you. Maybe as much as double.

The U.S. government sets the recommended dietary allowance (RDA) for protein, as well as for vitamins, minerals, fiber, fats, and carbohydrates. The RDA starts at a low of around 0.8 grams per kilogram of body weight for sedentary adults 18 and over, or about 0.36 grams per pound of body weight. (The RDA for children is higher, at 1.5 grams of protein per kilogram of body weight.)

This translates into 60 grams per day for a 150-pound person. But that doesn't mean that's the target you should be aiming for. For most active people and athletes, these guidelines are considered by most experts to be too low.

"A majority of researchers have been saying for decades that the RDA is well below where it should be- even too low for non-active people, let alone active people," says Douglas Kalman, Ph.D., RD.

Douglas Kalman, Ph.D., recommends a baseline intake of 1.4 grams per kilogram of body weight for everyone, or 0.6 grams per pound, for all people. For a 150-pound person, that equates to 90 grams per day.

Of course, getting all of those grams in a single meal would likely leave you with a stomachache. For this reason, our experts recommend

spreading them across several meals containing at least 20 grams, and as much as 40 grams.

DO ATHLETES NEED MORE PROTEIN?

Yes! The amount you consume should definitely go up to match increasing levels of activity.

If you're an active person and not into doing complicated math, Douglas Kalman, Ph.D., recommends aiming for somewhere around 1 gram per pound.

Krissy Kendall, Ph.D., says that 0.8 grams per kilogram of body weight is far too low for lifters and pretty much anyone else who exerts themselves regularly.

"Whether you're an endurance runner or a gym rat, you need more than the average amount to support the recovery and repair of your muscles. In fact, studies overwhelmingly suggest that athletes need more than twice the amount than sedentary people," Krissy Kendall, Ph.D.

In a position statement, the International Society of Sports Nutrition says an intake of between 1.4-2.0 grams per pound of body weight for active people is "not only safe, but may improve the training adaptations to exercise training." In a joint position statement, the Dietitians of Canada, Academy of Nutrition and Dietetics, and the American College of Sports Medicine recommend that some athletes can benefit from much as 2.3 grams per kilogram of body weight, or around 1 gram per pound of body weight.[3]

DO MEN AND WOMEN NEED THE SAME AMOUNT OF PROTEIN?

Men often consume much more per day than women, but this is generally due to the fact that men tend to weigh more than women. A 150-pound woman would need to consume the same amount of protein as a 150-pound man, assuming they both had the same physical goals in mind.

Women and men are far more similar than they are different, both genetically and in terms of their nutritional needs. This applies to all other nutrients as well.

Bill Campbell, Ph.D., the director of the Performance & Physique Enhancement Laboratory at the University of South Florida, has studied how varying amounts of protein in the diet influence body composition in resistance-trained women. [4] In the article "How Much Protein to Women Really Need?" he explained that adding an additional 400 or more calories of protein foods to the diets of women who were strength training several times a week had a surprising effect.

Not only did the women gain lean weight, but as Campbell writes, "The women on the higher-protein diet actually lost more body fat than women on the lower-protein diet, even though they consumed more calories!"

DO I NEED A PROTEIN SUPPLEMENT?

Some people can get all they need from food alone. But many others find it's expensive, inconvenient, or just uncomfortable to eat that

much. That's when it can be helpful to use shakes, powders, and bars to help.

"Consider powders and drinks to be supplements of convenience-and use them that way," Douglas Kalman, Ph.D., recommends. "If a shake after training is the only way you're going to get protein at that time, have the shake. If you're trying to gain weight-or lose weight-and you're in a position where you'd either have a shake or miss a meal entirely, have the shake."

HOW MUCH PROTEIN IS TOO MUCH?

In the past, some studies concluded that high-protein diets could pose a number of health risks, such as fat gain, potential kidney damage, and even danger to bone health. However, Jose Antonio, Ph.D., says in his video "3 Myths about High Protein Diets Debunked" that all three of these threats have been discredited in more recent research.

However, this isn't necessarily a reason to simply take a "more is better" approach. "There are definitely plenty of people in the strength and bodybuilding community who push their intake well beyond 2 grams per kilogram," explains Douglas Kalman, Ph.D. "Even if it's not hurting anything, it may not be helping enough to justify the expense and possible stomachaches. Plus, past a certain point, each gram you're taking in also means you'll have less room on your plate, and in your stomach, for nutrient-rich plants and other foods."

DO YOU NEED MORE OR LESS PROTEIN AS YOU AGE?

More. In his article "How to Eat for Maximum Muscle at Any Age," researcher and world-class powerlifter Layne Norton, Ph.D., recommends aiming for these daily standards over the course of your life:

- Under 18 years: 0.6-0.8 grams per pound of body weight
- 19-40 years: 0.8-1.1 grams per pound of body weight
- 41-65 years: 1.1-1.3 grams per pound of body weight
- Over 65 years: 1.3-1.5 grams per pound of body weight

"Even if you don't measure it out to the gram, the lesson here is that as you age, you need more protein," Layne Norton, Ph.D., says.

WHAT FOODS ARE HIGH IN PROTEIN?

The most concentrated forms of dietary protein are animal-based foods like fish, meat, and dairy products. Some of the most popular sources for athletes include lean steak, skinless chicken or turkey breast, tuna, eggs, and cottage cheese or yogurt.

On average, beef steak contains about 23 grams per 3-ounce serving, while the same amount of pork provides 26, and chicken provides about 24. Meat normally contains all nine of the essential amino acids our bodies need to get from food.

WHAT TYPES OF PROTEIN POWDER ARE THERE?

Powders enable people to quickly and easily consume this essential macro, and there are varieties on the market to match almost every dietary preference, food allergy, or flavor inclination.

But as Robert Wildman, Ph.D., RD, co-author of the textbook "Sports and Fitness Nutrition," says in his article "How to Pick the Perfect Protein Powder," "Not all are created equal. There are several protein supplement types to choose from, each with their own unique aspects and potential benefits."

Whey concentrate is the most popular form of protein powder, because it's easy to find, mixes well, and gets absorbed quickly. It is usually between 70-80 percent protein, with the rest of the mass coming from carbs, fats, and moisture. It can also be used before or after exercise and as a protein-rich snack between meals.

Whey isolate has little to no fats and carbs, and is usually around 85 percent protein. It is absorbed very quickly, making it a good choice immediately before and after physical exercise. It is also usually among the lowest-calorie protein powders

Whey hydrolysate is a supplement that has been partially broken down before you drink it. Your body is able to quickly absorb it to immediately start rebuilding damaged muscle tissue.

Casein is a popular choice for a nighttime protein drink because your body absorbs it more slowly than whey. Whereas whey gets absorbed in as

little as 20 minutes, casein takes more like 3-4 hours.

Milk protein isolate contains both whey and casein proteins, since both of those are present in milk. It is a common ingredient in ready-to-drink (RTD) proteins, and can help provide your muscles with amino acids both in the short term, and for several hours after you drink it.

Egg protein concentrate is a popular ingredient in blends, because it takes longer than whey protein to digest, but not as long as casein. Many athletes also get their egg protein from liquid egg whites, or of course, eggs! A medium-sized egg contains around 7 grams.

DOES PROTEIN POWDER CONTAIN ANIMAL PRODUCTS?

Some contain animal products like milk and eggs, but no actual meat. Others, like beef or chicken isolate, do contain meat derivatives. Plant powders are vegan (no animal products) and made from sources like rice, pea, and soy.

IS SOME PROTEIN POWDER DAIRY OR LACTOSE-FREE?

While most are made from milk, lactose-free proteins have been developed for people who have milk allergies. Some are made from lactose-free dairy. Others are completely dairy-free, like plant proteins and products made from eggs and beef.

If you're looking for a vegan or vegetarian products, there are more options than ever. Some of the most popular plant proteins include soy,

pea, brown rice, hemp, and blended plant proteins.

WHAT IS WHEY PROTEIN MADE OF?

Whey is derived from milk, which actually contains two proteins. Casein makes up approximately 80 percent in milk, and whey makes up the other 20 percent. When milk is turned into cheese, whey is separated from the solid curds and can be found in the liquid that is left behind.

Once separated, the whey goes through several more processing steps to become the product most people recognize. In this final form, it is a relatively tasteless powder that can be added to shakes, bars, or even baked goods. It's a common ingredient in commercial smoothies, bars, cereals, and plenty of other foods, but can also be taken on its own.

Like all proteins, whey is composed of amino acids, which the body can use for growth and tissue repair. But whey's high concentration of BCAAs, especially leucine, set it apart. Whey is by far the most popular protein supplement because it has been shown to promote muscle growth and fat loss.

ARE PROTEIN BARS GOOD FOR YOU?

These popular bars certainly can be good for you. They can also be little better than a candy bar. It depends on the ingredients. Food manufacturers often create products they call "protein bars," but which don't offer much protein, and contain

plenty of ingredients you may not want. Choose bars that provide an ample amount of high-quality protein without high amounts of calories, carbohydrates, and fats.

IS PROTEIN POWDER GOOD FOR YOU?

This is a complicated question. Sure, there are powders on the market that aren't good for you—maybe they're packed with extra sugar, or don't contain as much of their namesake as they claim. But there are also more high-quality products available today than ever before. Especially if you've been consuming a lower-than-optimal amount of protein, the simple addition of an extra shake or two a day could be just the thing to help you see positive changes in your body, your overall fitness level, and your ability to achieve athletic or physique goals.

IS PROTEIN POWDER SAFE FOR KIDS?

Children need lots of protein to grow, but this doesn't mean they necessarily need a supplement. Remember that the 7 grams in an egg, for instance, represents a far higher percentage of body weight for a 35-pound body than for a 150-pound body.

However, as long as a child has a healthy, balanced overall diet, there is no risk in giving them a moderate amount of a high-quality powder. For instance, if you are already making shakes or protein-rich baked goods for yourself, it's safe to share them with your children.

IS PROTEIN POWDER SAFE DURING OR AFTER PREGNANCY?

Research has shown that proper protein powder supplementation during pregnancy is not only safe, but can improve fetal growth, increase birth weight and height, and decrease the number of low-weight births.[8,9]

However, because everyone's body is different and the body's protein requirement changes throughout the pregnancy, consultations with a physician are highly recommended. Once your baby is born, you need extra calories, usually at least 200-500 per day, to maintain milk production.

HOW DO YOU MAKE A PROTEIN SHAKE?

A few years back, the most important thing to prioritize in a shake recipe was hiding the awful taste of the protein. Not any longer! Today, you can just mix a scoop with water in a shaker bottle, and more often than not, it'll taste great. But that's not your only option. In the place of water, you could use milk, almond milk, or any other fluid that matches up with your goals.

HOW IMPORTANT IS PROTEIN FOR BREAKFAST?

There are a number of great reasons to prioritize dietary protein early in the day. For one (or two), "Research has shown that consuming higher-protein breakfasts makes individuals feel fuller throughout the day, all while burning more fat,"

explains Jacob Wilson, Ph.D., in the article "What Are the Ideal Macros for My Breakfast?"

Wilson suggests having 30-40 grams at breakfast, and prioritizing fat more than carbs with the rest of what's on your plate. That may sound like a lot, but getting it could be as simple as having three whole eggs instead of two, a piece or two of bacon, and some yogurt with low-sugar fruit like berries on the side.

WHEN SHOULD I TAKE PROTEIN POWDER?

The post-workout shake is a great ritual of the fit life, but if you're just trying to make sure you're getting all you need each day, there is no specific time to take it. Many people start the day with a shake, or even mix a scoop into their cereal or yogurt. But dietary protein is healthy no matter if you have it at breakfast or dinner-or in between.

SHOULD I TAKE PROTEIN AFTER WORKING OUT?

The idea of an "anabolic window," or a small period of time post-workout when protein foods will translate more directly into gains, has been popular among bodybuilders for decades. However, recent research suggests that it's not as short, or as important, as once thought.

"Even if you delay your post-workout meal for a couple of hours, your body is still using the amino acids from your pre-workout meal to stimulate maximal growth and recovery," explains Krissy Kendall, Ph.D., in the article "Is the Anabolic Window Real?" "It certainly doesn't hurt to throw back a shake immediately after

your workout, but you can still gain a substantial amount of strength and size even when delaying post-workout nutrition."

However, especially if you tend to train in a fasted state, where you haven't eaten for several hours before training, there's an argument for having that shake as quickly as possible after training.

WHAT IS THE BEST PROTEIN POWDER?

Instead of asking this hard-to-answer question, consider asking a slightly different one: What is the best protein powder for you? The best is the one that tastes the best, gives you the amount you're looking for, and helps you reach the goals you've set for yourself. Your goal might be to just add some extra dietary protein to your diet, to bulk up and add mass and strength, or to lose weight.

CAN PROTEIN POWDER HELP YOU BUILD MUSCLE?

Jim Stoppani, Ph.D., a researcher and the owner and founder of JYM Supplement Science, says that whey powder is as close as it gets to a "required supplement" for anyone looking to build muscle, gain a performance edge, support weight loss, or enhance overall health and wellness.

Whey is so good for muscle-building because of its rapid rate of digestion. Whey is the fastest-digesting protein powder, and once you consume it, its amino acids rapidly break down and are absorbed into the bloodstream. Your blood then

carries these amino acids to tissue, where they can quickly initiate protein synthesis.

Whey also boosts protein synthesis because it's an extremely rich source of BCAAs, the branched-chain amino acids leucine, isoleucine, and valine. Research suggests that the leucine in whey acts much like the key to your car, turning on the powerful engine of protein synthesis.[8]

WHAT IS MUSCLE PROTEIN SYNTHESIS?

Scientifically speaking, protein synthesis is the process by which cells build protein molecules using DNA, RNA, and enzymes. Practically speaking, it's a process during which your body uses the amino acids found in protein to build new muscle.

Over the course of a day, your body fluctuates between two processes: building, also known as protein synthesis or "anabolism," and breakdown, also known as "catabolism."

After taking a protein supplement, there is a short period during which you have elevated amounts of amino acids in your blood. This period, known as hyperaminoacidemia, stimulates greater than normal amounts of muscle protein synthesis.

HOW MUCH PROTEIN SHOULD I TAKE TO BUILD MUSCLE?

If you're training hard or looking to get larger, aim for around 1 gram per pound of body weight, or around 2.3 grams per kilogram. No, it doesn't have to be exact, but even if dietary protein is the only thing you measure in your diet, it could be

what you need to finally see the serious results you've been wanting.

CAN PROTEIN POWDER HELP YOU LOSE WEIGHT?

The short answer: yes, but you still have to work.

Krissy Kendall, Ph.D., says this macronutrient is worth prioritizing first in your diet, and should make up at least 30 percent of your total calories when weight loss is the goal.

"Meeting your protein requirements in your diet is especially important when you increase your activity level (through exercise)," she says in the article "How to Lose Weight." "Not only does it help your body build and maintain muscle mass, it may help to facilitate weight loss, and can increase your feelings of fullness. So, while you may associate a protein shake primarily with getting bigger, it can be just as important an ally when weight loss is the goal!"

Dietary protein can also help you lose weight because it has a higher thermic effect than carbohydrates and fat combined. This means your body burns more calories to digest, absorb, and distribute nutrients from protein than with carbs and fats.

HOW MUCH PROTEIN SHOULD I TAKE TO LOSE WEIGHT?

The amount that we've advocated throughout this guide, 1.0-1.25 grams per pound of body weight per day, works just as well for weight loss as it does for weight gain. If you're otherwise restricting your calories, it's even more important to make sure you get enough protein!

To get maximum body-composition and appetite-management benefits, consume 20-40 grams of high-quality protein every few hours, rather than having just one or two massive meals a day.

WHAT IS THE BEST PROTEIN POWDER FOR LOSING WEIGHT?

Simply getting enough protein is more important than which variety you choose. However, if your

dietary preferences allow it, whey is tough to beat.

This fast-digesting protein supplement has been shown to positively impact the hunger hormones in your gut, the appetite control center in your brain, and to have a helpful impact on blood glucose levels, which has a positive impact on appetite and, in turn, on weight loss

Reviewed by: Douglas Kalman, Ph.D., R.D. and Susan Hewlings, Ph.D., R.D.

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