

Protein: Whey-ing the Differences between Supplement and Food Sources



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For many people, protein is a big portion of the diet. Some even add protein via extra food sources or supplemental uses. There are many types of protein supplements on the market with whey protein being the most popular among consumers. This paper looks at the positive effects of consuming whey protein supplements.

There are many sources of protein in our natural diets without having to add protein supplements. Foods high in protein include, but are not limited to: meats, legumes, milk and other dairy products (Dairy Council of California), as well as beans, nuts and whole grains (Harvard School of Public Health). Whey protein is a naturally occurring protein in cow's milk that gets separated from the milk during the processing of cheese (Whey Protein Institute). After this separation, the whey is in liquid form and can then be dried and made into a powder to be available for consumers (Whey Protein Institute). Whey protein is available to the consumer in many forms. Some of the most popular forms are as powders, nutritional bars and beverages such as smoothies or shakes (Dairy Council of California).

Several claims have been made for whey protein to gain popularity and increase sales. One claim that most everyone who buys whey protein supplements knows of has to do with athletes and body builders. The claim is that whey protein will help speed the rebuilding of muscles while decreasing the recovery time between workouts (wheyproteinpowders.org). Whey protein is considered a complete protein because it has all of the essential amino acids, as well as several branch-chained amino acids, which helps with the recovery time between exercise bouts and to rebuild lean muscle mass (wheyproteinpowders.org). The LIVESTRONG website states that whey protein is found in baby formulas in order to mimic the nutritional values of breast milk. Breast milk has an astonishing 80% of proteins that are whey-based to aid the baby with fast digestion and muscle development. According to the Whey Protein Institute, whey protein also assists with general wellness, senior citizen wellness, weight management,

improving the immune system, cancer prevention, HIV/AIDS maintenance, increased gastrointestinal health, and more.

One main manufacturer of whey protein is a company called Cytosport which makes the popular Muscle Milk. The serving size of whey protein powder is two scoops (about 70 grams), and contains 300 kcal, 12g of fat and 32g of protein (BestBodyBuilder). This powder can be put into smoothies, poured over oatmeal, mixed with yogurt or soups, and added into meatloaf (Dairy Council of California). Several researchers have performed experiments to see if whey protein actually has beneficial effects.

Hulmi et al (2010) wrote a review article on the effects of whey protein on skeletal muscle hypertrophy. They found that previously untrained men who ingest 15 grams of whey protein isolate (WPI) immediately before and after resistance training for 21 weeks showed increased skeletal muscle cross sectional area as well as accelerated increases in muscle thickness. These researchers also found that whey protein provides a post-exercise insulin response and allows a slightly smaller net protein balance and a quicker glycogen resynthesis to provide a faster recovery from exercise. Hulmi et al found that in both trained and untrained individuals, whey protein and the essential amino acids it provides can be more beneficial for promoting muscle hypertrophy if taken immediately after or immediately before *and* after resistance training, rather than if ingestions were not close to training time. It was also found that whey protein or total milk protein (whey with casein) better enhances muscle protein synthesis when ingested immediately post-exercise, compared to fasting conditions and trying to recover or the eating of carbohydrates or soy. Whey protein was also found to promote more muscle protein synthesis than either casein or soy. Hulmi et al classifies whey as a 'fast protein' because it leads to a quick access to amino acids after consumption, which would help athletes in their workouts. All in all, Hulmi et al found that whey protein supplements can increase

muscle hypertrophy in response to resistance training in healthy adults, as well as improve recovery from heavy exercise and decrease muscle damage and soreness.

Tipton et al (2006) conducted an experiment to determine the effects of whey protein on net muscle protein synthesis before and after exercise. They used healthy, young male and female humans who had not partaken in regular resistance training for at least five years prior to the start of the study. The participants were assigned to receive a 300 mL solution that contained 20 g of whey protein either immediately before (PRE) or immediately after (POST) a heavy leg resistance exercise session. The PRE group ingested the solution immediately before the workout, whereas the POST group took the solution one hour after the workout. The way the researchers determined net muscle protein balance was phenylalanine levels drawn from the leg. Tipton et al concluded that there was an anabolic response to the solution containing 20g of whey protein, but there was no significant difference between either ingesting the solution immediately before or one hour after each workout. Though there was no significant difference between the two experimental groups, the researchers found that some individual subjects showed large uptakes of amino acids by the leg when the whey protein solution was taken before exercises. The problem I have with this study is that the participants hadn't partaken in a regular resistance exercise regimen in at least five years, so any muscle growth seen could be due to the workout itself instead of the supplements. I think this would be a feasible thing to do as a lifestyle change but the experimenters should try the same study, only with individuals already on an exercise regimen, and measure the effects seen.

Akhavan et al (2010) looked at the effect of premeal whey protein consumption on postmeal glycemia and insulin responses in young adults. The participants in this study were men and women aged 20-27 years with BMIs between 18 and 24.9, and healthy. One group consisted of 16 men (experiment 1), and the other group had 12 men and 10 women (experiment 2). Experiment 1 had premeal treatments that comprised of control, 10, 20, 30, and

40g of whey protein, whereas experiment 2 had a premeal treatment of control, 5, 10, 20, and 40g of whey protein and 10g of whey protein hydrolysate (WPH). All subjects were given the same 300 kcal breakfast consisting of Honey Nut Cheerios, 2% milk, and orange juice after a 10 hour overnight fast, and were told not to eat or drink anything except water until one hour before the start of the study—which was four hours following breakfast. Once the experiment started, people in experiment 1 were given a choice of three different pizzas and instructed to eat until comfortably full. Folks in experiment 2 were not given a choice of pizza flavor and were told to finish all of the food within 20 minutes. Subjects' appetites and blood glucose levels were measured in both experiments, and insulin was measured in experiment 2. It was found that food intake was significantly suppressed with the varied doses of whey protein treatments, except a dose of 10g, and 40g of whey protein produced the lowest food intake compared to the control treatment in experiment 1. Experiment 2 found that WPH did not lower blood glucose postmeals. Akhavan et al concluded that small doses of whey protein consumed before meals reduces food intake and postmeal blood glucose while simultaneously reducing postmeal insulin responses and suggest this as a way for controlling blood glucose levels in insulin-resistant humans. After reading this study, I think that this might not be feasible in terms of amount being eaten by the subject. Adding 30-40g of a supplement to my diet before eating breakfast would be a large amount to consume, as well as eating a whole pizza in 20 minutes seems like a lot too. However, if the subject becomes used to adding the supplement to his/her diet, they may be able to continue this treatment in a long term sense. I think the only thing that would prevent the absorption of this much whey protein would be the ability to absorb this amount by the body—a regulated feedback system that works by itself. If more studies are performed to see if the effects on blood glucose levels can be generalized to a greater population, I would say this would be a good way to help treat people suffering from insulin resistance.

Based on the research I've done, I would recommend a whey protein supplement to consumers. I would not recommend the supplement to replace food sources of protein, but I would recommend it as an addition to current diets. Based on what I have found, I think that all populations benefit from whey protein, including people in the sports world, senior citizens, and infants. However, people who consume very little or no protein in their diets would benefit the most from adding this supplement to their diets. Because this supplement is actually found naturally in breast milk and cow's milk, there are no safety concerns with long-term use. The only health effect one may experience is an allergy if one already suffers from lactose intolerance. To reiterate: I would recommend whey protein supplementation as an addition to current diets and already consumed food sources of protein. This will help with increased muscle hypertrophy, weight management, increased immune function, regulated blood glucose/insulin levels, as well as general wellness.

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