

Whey: Way Good For You!

Whey proteins from dairy are not something new - they have been available for hundreds of years, though mostly considered as more or less a waste product of cheese production! It has only been during the last 20 years that new processing methods and scientific research have unlocked the true potential of whey proteins.

Today, whey protein is often described as a “nutritionally perfect protein” in the sense that it contains all of the essential and non-essential amino acids required by the human body. Whey’s amino acid profile is closely related to the optimal physiological needs of the human body, including an abundance of sulfur-containing amino acids, in a highly bio-available form. Whey protein’s quality is variously described by such terms as high *Biological Value* (BV), high *Protein Efficiency Rating*, (PER), and high *Net Protein Utilization* (NPU).

Such facts should not be surprising in that human breast milk is 80% whey protein!

In addition to the above description, whey protein may be the best candidate for maximizing muscle growth for two more reasons. Whey protein contains an optimal balance of amino acids for muscle growth, especially *glutamine* or glutamic acid, and *taurine*. L-Glutamine is the most abundant non-essential free amino acid in the body. The concentration of free glutamine appears to influence whether muscle will break down due to low glutamine content or build up via high glutamine content. Athletes suffering from overtraining syndrome seem to have decreased blood concentrations of glutamine. This may lead in turn to suppression of immune functions and slow recovery time following exercise. Even patients recovering from trauma (surgery, burns, stress, chemotherapy, radiation etc.) have an increased demand for glutamine. Such increased demand is probably the result of increased use of glutamine by the immune, antioxidant, and detoxication systems and the decreased integrity of various injured or irradiated tissues.

Whey protein's amino acid profile also features the highest percentages of *branched-chain amino acids* (BCAA). Diets high in BCAA demonstrate less muscle loss when the body muscle is being broken down as it is in severe infections, surgery, burns, calorie restriction, and strenuous exercise. This muscle and lean body mass sparing effect occurs because BCAAs serve as a direct energy source thereby lessening muscle breakdown for energy. You can see why scientifically formulated and processed whey protein blends have quickly become the choice protein among competitive bodybuilders!

Along with high amounts of glutamine and/or its precursors, glutamic acid and proline, whey protein also contains high amounts of the essential sulfur containing amino acid cystine, the disulfide form of the amino acid cysteine. Both cysteine and glutamine, along with glycine, are necessary the synthesis of the tri-peptide *glutathione* (GSH), one of the major detoxifiers (Phase II sulfonation) and antioxidants of the body. Enhancing glutathione levels also helps reduce the risk of infections by improving white blood cell

functions. However, the unique disulfide cysteine bonds of whey are very heat sensitive (thermo-labile) so only carefully processed *undenatured* whey proteins maximize these most important immune, antioxidant, and detoxicant benefits of whey.

The proteins in whey come in many sub-fractions, namely *Beta-Lactoglobulin*, *Alpha-lactalbumin*, *Immunoglobulins*, *Bovine Serum Albumin (BSA)*, *Glycomacropeptide (GMP)*, *Lactoferrin*, *Lactoperoxidase*, and *Lysozyme*.

Beta Lactoglobulin is the most abundant whey protein component, making up approximately 50-55% of the whey protein. It binds fat-soluble vitamins making them more available to the body. It is rich in muscle sparing energy supplying Branched Chain Amino Acids (BCAAs).

Alpha-lactalbumin is the second most abundant whey protein component, making up approximately 15-25% of the whey protein. It is primary protein found in human breast milk. Being high in tryptophan, an essential amino acid, potential benefits include sleep regulation and mood improvement under stress. An excellent source of essential amino acids and BCAAs, alpha-lactalbumin is the only whey protein component capable of binding calcium. Alpha-lactalbumin is also rich in thermo-labile cysteine disulfides that enhance glutathione levels.

Immunoglobulins (mostly IgG, with IgA and IgM), and *Bovine Serum Albumin (BSA)*, make up approximately 5-15% of the whey protein. BSA, another cysteine rich sub fraction, is the predominant whey protein component found in colostrum, which is thought to provide immunity enhancing benefits to infants, children and adults.

Lactoferrin makes up approximately 1-2% of the whey protein. Lactoferrin inhibits the growth of bacteria (including some pathogenic bacteria) and fungi due to its ability to bind iron. Iron is an essential nutrient often required for bacterial growth. Lactoferrin also promotes the growth of beneficial bacteria such as *L. Bifidus*, helping infants establish good microbial conditions in the intestines (eubiosis). It is also an anti-oxidant that naturally occurs in many body secretions such as tears, blood, breast milk, saliva and mucus. Lactoferrin is the third cysteine rich sub fraction.

Lactoperoxidase makes up approximately 0.5% of the whey protein. Like lactoferrin, it inhibits the growth of iron dependent bacteria.

Lysozyme makes up less than 0.1% of the whey protein. Lysozyme contains immunity enhancing properties.

Glycomacropeptide (GMP) helps control appetite and inhibit the formation of dental plaque and dental cavities.

Weighing the Benefits of Whey

Whey proteins are an ideal source of protein and essential amino acids, perhaps most particularly for those ill and elderly with declining appetites, challenges with food preparation, less than optimal dentition and/or digestive strength. Whey provides easily digested energy, while boosting detoxication efficiency, antioxidant status, immune system efficiency and lean body mass. Being low in carbohydrates and high in protein, it is great for restricted carbohydrate diet strategies.

New preliminary but exciting research reported in the January 2002 issue of Life Extension magazine suggests whey may be able to reduce stress and depression by lowering cortisol and increasing brain serotonin, improve liver function in those suffering from certain forms of hepatitis, help chronic fatigue, improve athletic performance, and reduce blood pressure.

According to the Whey Protein Institute, whey proteins have recently been shown to have potential positive impact in other areas including appetite suppression, cholesterol reduction, and the inhibition of dental plaque and dental caries.

Researchers at the Arkansas Children's Nutrition Center have found that whey and soy protein may help prevent breast cancer. The research, funded by the U.S. Department of Agriculture (USDA), is featured in the January issue of Cancer, Epidemiology, Biomarkers and Prevention, an official journal of the American Association for Cancer Research.

Weighing the Different Forms of Whey

Whey Protein Concentrates (WPC) may vary from low (35%) to high (80%) protein and from fairly low to moderately high lactose. Whey Protein Isolates (WPI) and hydrolyzed whey protein (HWP) contain little to no appreciable lactose or carbohydrates, are less than 1% fat, and are 80% to 90% protein!

To be of the greatest health benefit, whey protein supplements must be processed at a low temperature for whey's immune factors are denatured or otherwise damaged by heat.

Most health professionals recommend whey products from cows not given growth hormones, routine prophylactic antibiotics, or feed containing antibiotics or animal byproducts.

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