

The Science Behind Protein and Satiety

A Closer Look at the All-Natural, High-Quality Protein Found in Eggs

Fill up and not out!

Research suggests that high-quality protein foods, such as eggs, keep appetites satisfied longer, aid in weight management and fat loss and help to preserve lean muscle mass.

Eggs are all-natural and provide one of the highest quality proteins of any food available. In fact, the quality of egg protein is so high that scientists historically have used eggs as the standard for measuring the protein quality of other foods.

One egg provides more than six grams of protein, or 13 percent of the Daily Value (DV) or Daily Reference Value (DRV). While many people think the egg white has all the protein, the yolk actually provides nearly half of the protein content.

The research says...

- **Lose more weight:** Eating eggs for breakfast as part of a reduced-calorie diet helped overweight dieters lose 65 percent more weight, lower their Body Mass Index (BMI) by 61 percent and feel more energetic than dieters who ate a bagel breakfast of equal calories.¹
- **Eat fewer calories:** Enjoying eggs for breakfast helped overweight adults feel fuller and consume an average of 330 fewer calories throughout the day than adults who ate a bagel-based breakfast with the same number of calories.²
- **Feel less hungry:** Men who ate 25 percent more than the recommended allowance for protein reported less hunger and desire to eat than those who ate less protein.³ In another study, adults who increased their intake of dietary protein from 15 percent of calories to 30 percent decreased their overall intake of calories and reported less hunger than those who did not.⁴ Research also reveals that eating a calorie-restricted diet, with additional protein at breakfast from eggs and lean Canadian bacon, results in an increased feeling of fullness throughout the day.⁵
- **Lose more fat:** Eating more high-quality protein (found in eggs, low-fat dairy and lean meats) and decreasing intake of carbohydrates is an effective way to increase fat loss and preserve muscle tissue during weight loss. A study of healthy adults found that high-protein meals may increase energy expenditure and fat oxidation in individuals with higher body fat.⁶
- **Suppress hunger:** A study of healthy men found that eating a breakfast of either a whole egg or egg yolk helped slow the rate at which food leaves the stomach and increased the levels of two hormones that act as hunger suppressants.⁷
- **Improve health profile:** Women who consumed higher amounts of protein from foods such as eggs, meat and milk lost slightly more weight, felt fuller, had better plasma cholesterol profiles and had better blood glucose levels than a group of women who consumed the same number of calories on a high-carbohydrate diet.⁸



- **Maintain better blood sugar levels:** High-quality protein, as found in eggs, low-fat dairy and lean meats, helps stabilize blood glucose levels.⁹ A study of healthy adults found that eating a breakfast containing egg protein resulted in lower insulin responses and better maintenance of blood sugar levels than eating an otherwise identical breakfast containing ham protein.¹⁰
- **Weight maintenance:** Following weight loss, adults who consumed diets higher in protein were better able to manage their weights than adults on a lower protein diet. In fact, the group that consumed a diet with 18 percent of total calories from protein had smaller waist circumferences and less weight regain.¹¹
- **Maintain muscle mass:** A study of older men and women found that those who ate the most protein lost approximately 40 percent less muscle mass over three years than those who ate the least protein. Inadequate dietary protein contributes to age-related muscle loss, also called sarcopenia, and may lead to the inability to perform day-to-day tasks and a greater risk of mortality.¹²

¹ Vander Wal JS, et al. Egg breakfast enhances weight loss. *Int J of Obesity*. 2008; 32:1545 – 1551.

² Vander Wal JS, et al. Short-term effect of eggs on satiety in overweight and obese subjects. *J Am Coll Nutr*. 2005; 24(6):510-515.

³ Apolzan JW, et al. Inadequate dietary protein increases hunger and desire to eat in younger and older men. *J Nutr*. 2007; 137:1478-1482.

⁴ Weigle DS, et al. A high-protein diet induces sustained reductions in appetite, ad libitum calorie intake, and body weight despite compensatory changes in diurnal plasma leptin and ghrelin concentrations. *Am J Clin Nutr*. 2005; 82:41-48.

⁵ Leidy HJ, et al. Increased dietary protein consumed at breakfast leads to an initial and sustained feeling of fullness during energy restriction compared to other meal times. *BJN*, published online September 2, 2008.

⁶ Batterham M, et al. High-protein meals may benefit fat oxidation and energy expenditure in individuals with higher body fat. *Nutrition & Dietetics*. 2008; 65:246-252.

⁷ Pelletier X, et al. Effect of egg consumption in healthy volunteers: influence of yolk, white or whole-egg on gastric emptying and on glycemic and hormonal responses. *Ann Nutr Metab*. 1996; 40(2):109-115.

⁸ Layman DK, et al. A reduced ratio of dietary carbohydrate to protein improves body composition and blood lipid profiles during weight loss in adult women. *J Nutr*. 2003; 133:411-417.

⁹ Layman DK. Protein quantity and quality at levels above RDA improves adult weight loss. *J Am Coll Nutr*. 2004; 23(6):631S-636S.

¹⁰ Guillaume C, et al. Effect of exchange of ham for boiled egg on plasma glucose and insulin responses to breakfast in normal subjects. *Diabetes Care*. 1986; 9(1):46-49.

¹¹ Lejeune MPGM, et al. Additional protein intake limits weight regain after weight loss in humans. *British J Nutr*. 2005; 93:281-289.

¹² Houston DK, et al. Dietary protein intake is associated with lean mass change in older, community-dwelling adults: the Health, Aging, and Body Composition (Health ABC) Study. *Am J Clin Nutr*. 2008; 87(1):150-155.

