



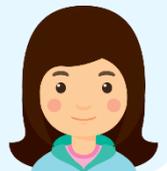
Dairy: A source of high-quality protein

- Consuming dairy products as part of a healthy and balanced diet is an affordable way of contributing to fulfilling dietary requirements for protein. ⁽⁷⁾
- Dairy products such as milk, yoghurt and cheese are good sources of essential nutrients, including high quality proteins ⁽²⁾ crucial for many bodily functions. ⁽¹⁾
- Proteins from animal sources, such as dairy protein, contain all essential amino acids and are therefore considered to be highly digestible and of high quality. ⁽⁸⁾
- Animal proteins, such as dairy proteins, are of a 10-30% higher biological quality than vegetable sourced proteins. ⁽³⁹⁾
- Dairy proteins play an important role in bone health ⁽²⁾, muscle growth and sports nutrition. ⁽³⁾
- Dairy protein may be beneficial for weight management. ⁽⁴⁾
- The benefits of dairy protein have been studied in the context of ageing processes ⁽⁵⁾ and non-communicable diseases. ⁽²⁸⁾

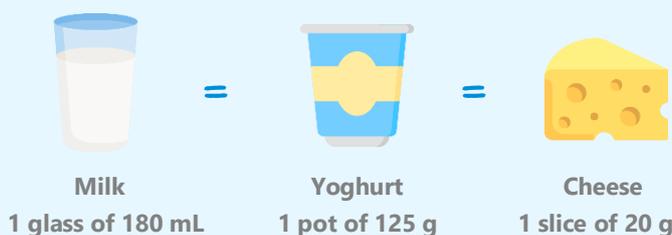
Protein is essential for many bodily functions and structures ⁽⁹⁾

- The recommended daily intake of protein **is around 0.8 g/kg of body weight**, depending on age, size and sex. ⁽⁸⁾ The daily protein intake is mainly covered through foods, such as dairy products. ⁽¹⁰⁾
- Protein contributes to the growth and maintenance of bones and muscle mass. High protein intake has been linked to many health benefits, including heart and bone health, weight management, a reduced risk of metabolic diseases (such as diabetes) and mortality rates. ⁽³⁸⁾ With recent studies having been positive so far, further research will be necessary in order to fully substantiate these benefits.

The recommended daily intake of protein is around 0.8 g/kg of body weight.



6 grams of protein in Dairy foods ⁽¹²⁾



The high biological value of milk protein

Animal proteins, such as dairy proteins, are of a 10-30% higher biological quality than vegetable sourced proteins. ⁽³⁹⁾ This has been acknowledged by EFSA in the "Scientific Opinion on Dietary Reference Values for protein" (2012). ⁽⁸⁾

- Milk contains **two types of protein: casein** (80%) and **whey** (20%).^(13,14)
- **Dairy protein is of a high biological value** as it provides **all the essential amino acids** that the human body requires and is not able to synthesise itself. Diets that are lacking in essential amino acids may cause impaired growth, infections, suboptimal muscle capacities and a decreased mental performance.⁽¹⁶⁾
- The protein classification is based on properties such as **digestibility and bioavailability**⁽¹⁵⁾ Nutrient bioavailability⁽¹⁷⁾ is the amount of nutrients that is actually utilised by the human body after nutrient intake. The bioavailability is different for each nutrient. Biological value/quality⁽¹⁶⁾ is a measure that captures how readily the digested protein can be used in protein synthesis in the cells of the organism.

	PD-CAAS (%)	Limiting amino acid(s)
Animal sources		
Egg	>1.0	-
Milk, cheese	>1.0	-
Meat, fish	>1.0	-
Vegetable sources		
Soy	~0.95	Met+Cys
Beans	~0.7-0.75	Met+Cys
Rice	~0.65	Lys
Wheat	~0.5	Lys
Maize	~0.5	Lys

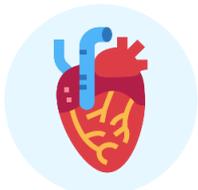
Example of values for Protein Digestibility-Corrected Amino Acid Score (PDCAAS) values of different foods for adults (adapted from: AFSSA, 2007; Michaelsen et al., 2009; WHO/FAO/UNU, 2007)



The table depicts the protein digestibility-corrected amino acid score (PDCAAS) of various products, where the quality of protein is evaluated upon the amino acid requirements of humans and their ability to digest it. With 1 being the highest score and 0 the lowest, milk and cheese score exceptionally well, highlighting the superior quality of dairy protein.

- **Dairy also contains bioactive peptides** which are produced during the digestion of proteins in the gut and during the fermentation of milk during manufacturing processes, e.g. in cheese and yoghurts. Studies have shown that dairy bioactive peptides may be linked to **several beneficial health effects**, such as anti-bacterial, anti-hypertensive, anti-inflammatory, anti-oxidant and blood cholesterol-reducing effects.^(1,4,18, 21,38)

Health benefits of milk protein



Heart diseases are influenced by risk factors such as hypertension, obesity, diabetes, systemic inflammation and atherosclerosis.⁽⁴⁾ Some studies have demonstrated that high intakes of dairy may be linked to lower blood pressure⁽⁴⁰⁾ and reduced risk of hypertension, possibly due to the bioactive peptides and other relevant milk components.^(4,15,18)

Up to 50% of the bone volume is composed of protein⁽²²⁾ therefore a continuous supply of dietary proteins is required for **bone's structural compounds**.^(18,23) Protein also enhances the bone mineral density resulting in stronger bones.^(18,23) Dairy is composed of several minerals, such as calcium, magnesium and phosphorus, which are essential for bone health.⁽²⁾





Many studies report that dairy can positively support **weight management**.^(4,24) Dairy proteins interact in metabolic mechanisms which may influence body weight and composition, by e.g. increase in muscle mass.^(15,25) Recent studies have shown that milk proteins can also reduce inflammatory processes often present in the obese population.⁽¹⁵⁾

Studies show that dairy bioactive peptides may have protective **anticancer properties**^(4,18,19,26), especially for colon, breast and prostate cancer⁽¹⁴⁾ with a potential in supporting dietary cancer management.^(25,27,28) The anti-cancer qualities of dairy peptides may originate from their anti-oxidant and anti-inflammatory characteristics.^(14,29) Some evidence suggest that the high levels of dairy calcium may reduce the risks of colorectal (bowel) cancer, by binding secondary bile acids and free fatty acids that could otherwise have a toxic effect on the cells of the colon.^(1,37)



A part of the ageing process is the loss of muscle mass.^(11,30) About 30% of elderly over 60 years old and 50% of over 80 year olds suffer from this condition.⁽³⁰⁾ Evidence shows that higher intakes of protein in the elderly (higher than the minimum recommendation of 0.8g/kg body weight/day) have significant benefits regarding **muscle mass, strength and function**.^(30,31) The European Society of Parental and Enteral Nutrition (ESPEN), recommends to healthy older individuals a daily protein intake of 1-1.2g/ kg body weight.⁽³²⁾ Protein helps the elderly maintain muscle mass and mobility,⁽³³⁾ it is therefore recommended that every meal should contain high quality proteins^(30,34) providing all essential amino acids and other valuable nutrients, such as those found in dairy products.⁽³⁵⁾

Sports: people that regularly exercise intensively may have a higher requirement for protein intakes than the general population.⁽²⁵⁾ Milk proteins are therefore often used in sport foods in order to aid with muscle growth and muscle mass maintenance. Milk proteins can help in recovering after exercise⁽²⁵⁾ Some studies suggest that the combination of whey and casein proteins found in milk enhance protein synthesis after endurance exercises, such as running.⁽⁴¹⁾ Milk is therefore seen as an effective sports drink, as it helps to promote muscle recovery after exercising.⁽³⁾



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