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# Proteins in Human Nutrition: Recommendations

## ***Requirements in adults:***

Recommended intake of proteins is between 0.8 g and 2.0 g protein/kg b.wt./d; 0.8 g representing the minimum daily needs to maintain short-term nitrogen balance in healthy subjects with moderate activity. The upper tolerable limit (2.0 g) has been set because of uncertainty of the health effects of higher amounts of dietary proteins.

Protein requirements are the same for all age groups of adults and are independent of gender, because there are insufficient scientific data to describe recommendations for subgroups of the population. When expressed as a percentage of energy, protein intake should be 10-20% of energy requirements. Adequate energy intake from non-N-energy sources is a prerequisite for the present recommendation. During pregnancy and lactation, protein requirements are increased (1.1 g /kg b.wt./d during pregnancy, and 1.3 g/kg b.wt./d during lactation, respectively).

## ***Requirements in children and adolescents:***

The actual protein reference values (= recommended dietary allowance) for children are 1.8 g/kg b.wt./d in the 1st month, and 1.1 g/kg b.wt./d in the 12th month of age. In the age range of 1 to 4 years it is 0.86 g/kg b.wt./d and 0.91 g/kg b.wt./d up to the age of 10 years. After age 11 until 18 yrs, protein requirements are gender specific, 0.85-0.91 g/kg b.wt./d for male adolescents, and 0.82-0.90 g/kg b.wt./d for females.

WHO also included mean reference values for absolute protein requirements: 10.2 g/d at 6 month of age, increasing to 57.9 g in males and 47.4 g in female adolescents aged 15-18 years.

Current protein intake by Swiss children and adolescents is on the average too high - the actual intake of proteins is about 40 g/d at two years, 60 g/d at three years and 100 g/d and even more at 13-15 years. Excessive protein intake in small children has been associated with adult obesity. During ages of 5-6 years excessive protein intake may lead to early puberty.

## ***Requirements in elderly subjects:***

The current recommendation for minimal protein intake of healthy elderly subjects is 0.8 g/kg b.wt./d and, thus, the same as for younger adults. Despite conflicting evidence and a controversial debate among experts in recent years about the adequacy of this amount, a WHO/FAO/UNU committee recently confirmed this recommendation irrespective of gender and age.

### **Further information:**

It is important to ensure a protein intake of at least 0.8 g/kg b.wt./d in all the elderly, particularly in those at risk for malnutrition (e.g. frail and multimorbid elderly). Protein requirements to improve bone health may be higher than these minimal requirements (see chapter on bone health below).

### ***Requirements in sports:***

The daily protein intake for adult athletes recommended by most authorities is about 1.5 g/kg b.wt./d with a range of 1.0 to 2.0 g/kg b.wt./d. Protein ingestion before exercise has been reported to increase protein synthesis. The earlier suggested separate dietary protein recommendations for strength and endurance athletes are no longer supported and this recommendation needs to be adapted to the individual needs of the athlete.

### ***Protein intake in obesity and in diabetes***

Consumption of relatively higher amounts of protein in obesity (up to 1.3 g/kg b.wt./d) resulted in greater weight loss or in less weight regain after voluntary weight loss than for lower amounts of protein in studies lasting up to one year. High protein diets maintained fat-free mass (i.e. muscle mass) and increased calcium balance, resulting in preservation of bone mineral content.

The consumption of dietary proteins is frequently insufficient during massive weight loss, e.g. after obesity surgery (i.e. gastric bypass).

A relatively high amount of protein (up to approx 1.3 g/kg b.wt./d) in the diet may be of particular importance in obese diabetic or hyperlipidemic subjects. Dietary protein has no significant negative effects on blood glucose control, on serum lipids or on other cardiovascular risk factors. However, dietary protein intake should not be excessive, and there are insufficient long-term data (beyond 2 yrs) of such eating habits. Increased protein intakes are contraindicated in elderly or obese subjects with renal impairment.

### ***Protein intake and bone health***

Several studies point to a positive effect of relatively high protein intake (up to 1.5 g/kg b.wt./d) on bone mineral density or content and on hip fracture risk. However, excessive amounts of dietary protein (i.e. more than 2.0 g/kg b.wt./d) associated with low calcium intake (i.e. less than 600 mg/d) may have adverse effects on bone health.

### ***Protein intake in catabolic illness***

Present recommendations indicate that protein intake should be between 1.2 and 1.5 g/kg b.wt./d, combined with an energy intake of 20-25 kcal/kg b.wt./d over the first 72-96 hours after an acute catabolic event (trauma, severe illness) in order to minimise body protein loss in severe catabolic illness. In addition, glutamine and possibly leucine may specifically improve clinical outcomes. Thereafter, energy intake should be increased to target levels.

Enteral "immunonutrition" via tube feeding and enriched with arginine, nucleotides and omega-3 fatty acids is indicated in patients with trauma, ARDS and mild sepsis. Glutamine (0.2-0.4 g/kg b.wt./d of L-glutamine) should be added to enteral and to parenteral (intravenous) nutrition in burned and trauma patients (ESPEN guidelines 2006 and 2009).

#### **Further information:**

Federal Office of Public Health, Consumer Protection Directorate, Food Safety Division, phone +47 31 322 05 08, [Lebensmittelsicherheit@bag.admin.ch](mailto:Lebensmittelsicherheit@bag.admin.ch)

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### ***Protein intake in renal and in hepatic diseases***

Limitation of ingested protein, particularly from animal sources, to approx. 0.8 g/kg b.wt./d is important to slow down the progression of chronic kidney disease with impaired excretory function. In contrast, patients with chronic renal failure undergoing renal replacement therapy by haemo – or peritoneal dialysis have an increased dietary protein demand. Protein intake in patients with cirrhosis of the liver should be increased to 1.0-1.2 g/kg b.wt./d in order to prevent protein malnutrition. In patients with advanced hepatic encephalopathy, moderate protein restriction depending on protein tolerance (0.5-1.2 g/kg/d) has been recommended, with the possible addition of branched chain amino acids (BCAA).

### ***Key practical recommendations for the consumer***

- Dietary proteins should be included in each meal of the day; consume at least 3 meals per day.
- Do not skip breakfast. A protein-containing breakfast prevents whole body protein catabolism during the morning.
- Some groups in the population are at an increased risk of not eating enough dietary proteins:
  - a. Elderly people - because of poor appetite, co morbidities, psychosocial circumstances.
  - b. People with impending or established osteoporosis,
  - c. Subjects eating hypo caloric or imbalanced diets. Remember that your dietary protein needs are maintained if your caloric intake is decreased; during a hypo caloric diet, the percentage of dietary proteins should be increased.
  - d. Sick individuals - they have increased protein and energy needs but often consume too little proteins due to anorexia.
- Dietary proteins should be consumed in higher amounts than to cover minimal needs in athletes; the same is true if optimal bone health (prevention of osteoporosis) is desired.
- Dietary proteins play a specific favourable role in obesity and diabetes due to their high satiating effect and their “neutral” behaviour regarding glucose and lipid metabolism.
- Subjects with renal impairment should limit the intake of dietary proteins to the minimum needed to prevent protein catabolism.
- Read the food labels where pertinent information on protein content is available.

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