

Proteins in food

Proteins are macromolecules composed of AMK linked by peptide bonds. Essential amino acids: isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan, valine; for children and histidine. Complete proteins with the highest biological value are defined as those that contain all the necessary amino acids - these are animal proteins, and plant proteins are yeast and soy proteins. Proteins of vegetable origin are mostly incomplete proteins and their biological value is determined by the limiting (deficient) essential amino acid (e.g. lysine in wheat flour). However, protein sources can be combined in such a way that the organism is optimally saturated with all AMK.

Function

Their function is the construction of new and restoration of degraded cellular structures. They are part of enzymes, hormones, genetic structures and defense substances and an important source of nitrogen. The supply of protein to the organism should be such that it maintains a balanced nitrogen balance. In addition to the basic structural function in the protein molecule, each AMK also has its own specific function in the body - e.g. methionine and cysteine as methyl group carriers are used in the synthesis of a number of functionally important substances in the body - glutathione (detoxification processes), choline (protection liver bb.), phenylalanine and tyrosine (synthesis of adrenaline, thyroxine, pigment).

Metabolism

Proteins are broken down by proteolytic E, individual AMK are used to create body proteins or are further broken down by decarboxylation, transamination, deamination. These metabolic products are then incorporated into the overall biochemical processes of the organism and used for specific purposes according to the nature of AMK.

Physiological need

The optimal intake seems to be 0.7 - 1 g/kg of ideal body weight with approx. 50% representation of animal and 50% representation of vegetable proteins. The specific need is influenced by age, health and physiological state (childhood, pregnancy, lactation, convalescence, higher physical load). The minimum protein intake, which is still sufficient to ensure the basic life processes of the organism, is 0.5 - 0.6 g/kg of weight.

Lack

1. Protein malnutrition (kwashiorkor) with a long-term lack of proteins and a relative excess of carbohydrates - mainly in a growing organism. KO: edemay, muscle atrophy, psychomotor changes;
2. disruption of immune processes;
3. insufficient growth or renewal bb. and tissue;
4. damage to the synthesis and function of enzymes;
5. changes in the biotransformation of xenobiotics;
6. insufficient synthesis of glutathione;
7. affecting hormonal activity;
8. disruption of spermatogenesis;
9. increase in oncogenic risk with choline and methionine deficiency.

Excess

More than 1.6 g/kg ideal weight is considered excess:

1. products of the metabolism of unused AMK (e.g. biogenic amines - histamine, tyramine, serotonin, as decarboxylation products) can have a toxic effect, or they can also interfere with the process of oncogenesis (putrescine, cadaverine or activated forms of heterocyclic amines resulting from heat treatment of food);
2. amino acid residues broken down via ketogenesis can participate in increasing the level of endogenous cholesterol (animal proteins have higher hypercholesterolemic effects than vegetable proteins);
3. protein grafts can represent precursors of nitrosation reactions leading to the formation of carcinogenic A-nitroso compounds (nitrosamines, nitrosamides);
4. high protein consumption with a stimulating effect on division and proliferation bb. may promote the graduation phase of the carcinogenic process by excessive formation of ex-cadaverine and putrescine in the small intestine;
5. an excess of animal protein is usually always accompanied by an unnecessarily high intake of fats (meat, meat and dairy products) with all the risks.

Links

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- Types of food
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- Mineral substances in food
- Trace elements in food
- Microorganisms in food
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References

- BENCKO, Vladimir, et al. *Hygiene – teaching texts for seminars and practical exercises*. 2. edition. Prague : Charles University, 2002. 204 pp. ISBN 80-7184-551-5.