

Estimation of daily requirements for energy and nutrients

To keep energetic balance in the body, adult human should take about 8 400 kJ of energy. Energetic requirements are dependent on the life-style and daily activities of the individual (Table 1).

Table 1. Consumption of energy

Work:		kJ/h
Very easy work	office work in sitting	210-250
Easy work	work in sitting with occasional walk	250-300
Mild work	longer walk without load	700-1300
Middle-hard work	wearing a load	1300-2100
Hard work	manual work	2000-2500
Maximum effort	hard manual work intensive training	3000-3800

Daily consumption of energy expresses requirements of the body to cover:

1. **basal metabolic rate** (i.e. energy necessary to cover production of heat and basic functions, such as heart activity, breathing, activity of brain, kidneys etc.)
2. **work metabolic rate** (i.e. energy consumed during daily activities over BMR)
3. **specific dynamic effect of the food** (i.e. energy consumed in oxidation of nutrients)
4. **digestion**.

Due to requirements for development and growth, energetic requirements of children are relatively higher than in adults (Table 2).

Table 2. Requirements for energy in kJ per kg body weight according to age

Age	Energy requirements (kJ/kg body weight)
Sucklings <6 months of age	460
Sucklings >6 months of age	420
Children 2 - 5 years	340-380
Children 6 - 10 years	300-340
Children 11 - 14 years	250-300
Adolescents 15 - 18 years	170-220
Adults	110-150
Older age	80-100

Basic rules for **healthy alimentation**, i.e. alimentation which is able to cover all requirements for energy and nutrients according to age, gender, height and life-style of the individual are: sparseness in eating, balance between the individual nutrients, regular food intake, variety of the foodstuffs and sufficient intake of fluids (in adults 2-2,5 L daily, in children 1 L daily, in suckling 120 mL/kg/day).

To keep optimal body weight, intake of energy should be in balance with energy expenditure (in the form of physical activity and production of heat). Daily energy should be split into 5 main meals: **breakfast 25-35 %**, **snack (before noon) 5 %**, **lunch 25-35 %**, **snack (after noon) 5 %** and **dinner 25-30 %**, with time intervals between the meals not longer than 5 hours.

Important is also the composition of the food – the balance between the nutrients: **10-15 % proteins**, **25-30 % fats** and **60-64 % saccharides**.

Adults should take 55-70 g of **proteins** (Table 3), especially of animal origin (meat, milk, eggs, fish), which contain aminoacids in the ratio and quality necessary for proteosynthesis.

Table 3. Requirements for proteins in g per kg body weight according to age

Age	Requirements for proteins (g/kg body weight)
Sucklings – maternal milk	2
Sucklings – artificial milk	2.5-4.0
Children <6 years	2.5-3.0
Children 7 - 9 years	2.5
Children 10 - 15 years	2.0
Adolescents 15 - 18 years	1.5-1.7
Adults	1.0-1.2
Pregnant women	1.5-2.0
Breast-feeding women	2.0-2.5

Fats should represent up to 30 % of total intake, i.e. <50-80 g daily (Table 4). Important is also the ratio between saturated (fats of animal origin) and unsaturated fats (vegetable fats and oils, fish). Trend is to reduce the proportion of saturated fats in the food, since they participate in the development of obesity, atherosclerosis, cancer and other diseases.

Table 4. Requirements for fats in g per kg body weight according to age

Age	Requirements for fats (g/kg body weight)	Requirements for linolic acid (g/day)
Little children	3-5	2-8
Older children	2-3	2-8
Adolescents	2.0-2.5	2-8
Adults	1	6-9

Intake of **saccharides** should be higher than 60 % of total intake (Table 5). Trend is to reduce the proportion of sugar to <10 % (prevention of obesity and diabetes mellitus) and to increase the proportion of roughage (cereals, legume, vegetable, fruits) in the food up to 25-35 g/day, what has positive effect in prevention of many diseases including cancer.

Table 5. Requirements for saccharides in g per kg body weight according to age

Age	Requirements for saccharides (g/kg body weight)
Little children	10-15
Older children and adolescents	5-10
Adults	4-5

Objective biological requirements of the organism are included in **recommended doses of nutrients** (RDN), which determine physiologically reasoned intake of basic nutrients, vitamins (Table 6) and minerals (Table 7).

Table 6. Recommended daily doses of vitamins in children and adults

Vitamins	Children	Adults	Vitamins	Children	Adults
A	400-1000 µg	750-1200 µg	B ₆	0.3-1.8 mg	1.8-2.1 mg
D	7.5-10 µg	5-7.5 µg	B ₃	2-8 mg	8 mg
E	5-12 mg	12-16 mg	Folic acid	60-200 µg	200 µg
B ₁	0.2-1.5 mg	1-1.5 mg	B ₁₂	0.3-2.4 µg	2 µg
B ₂	0.4-2.2 mg	1.2-2 mg	H	?	150-300 µg
Nicotinic acid	4-24 mg	12-23 mg	C	50-100 mg	75-90 mg

Table 7. Recommended daily doses of minerals in children and adults

Minerals	Children	Adults	Minerals	Children	Adults
Calcium	500-1200 mg	800-1100 mg	Copper	0,5-2,5 mg	1,5-2,5 mg
Iron	8-15 mg	10-16 mg	Chrome	15-180 µg	60-150 µg
Magnesium	50-400 mg	300-400 mg	Selenium	10-60 µg	50-70 µg
Phosphorus	300-1200 mg	1000-1200 mg	Iodine	40-180 µg	150-200 µg
Zinc	5-16 mg	10-12 mg			

Basic needs in formation of well-balanced food are *standard tables of foodstuffs*, which contain data on composition of the food, content of energy and nutrients in 100 of the individual foodstuff.