

PRINCIPLES

O F R A T I O N A L

DATE COMPOSITION



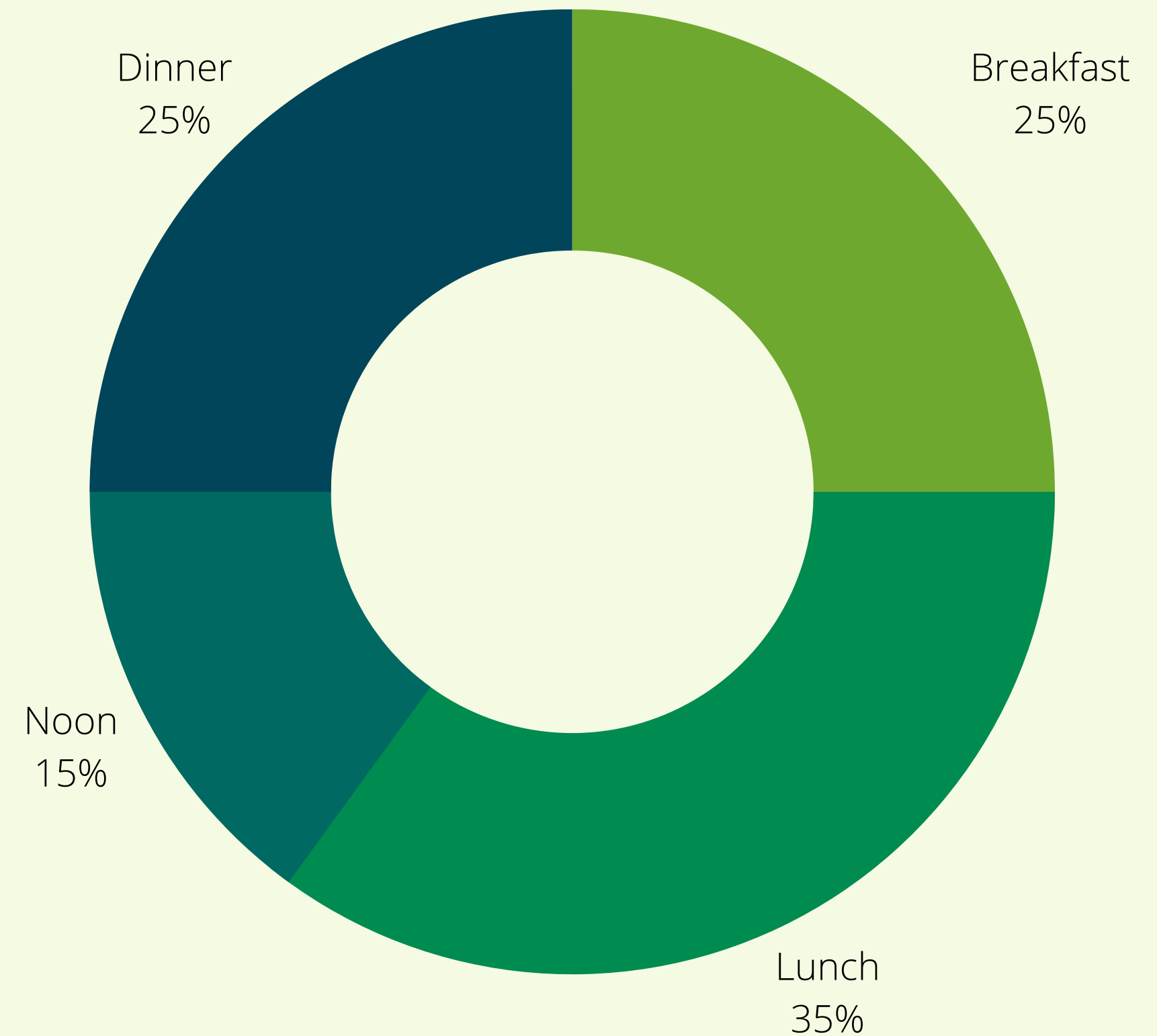
RATIONAL NUTRITION

is a person's diet that takes into account their physiological needs for energy value, useful nutrients (proteins, fats, carbohydrates, vitamins, minerals, trace elements, other useful substances) based on data on age, diseases, physical activity, employment, environment.



EATING HABITS

Spending energy for your activity and getting it from food, you need a balance to prevent excessive energy storage in the form of fat deposits or conversely, the transition to the consumption of internal reserves. Rational nutrition includes the observance of a dietary regime. Optimal is four meals a day, when meals are eaten at intervals of 4-5 hours at the same time.

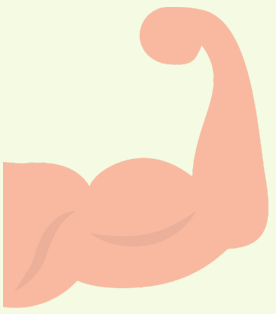


BALANCED NUTRITION

A balanced diet provides the optimal ratio of proteins, amino acids, fats, fatty acids, carbohydrates, and vitamins for the human body in the daily diet.

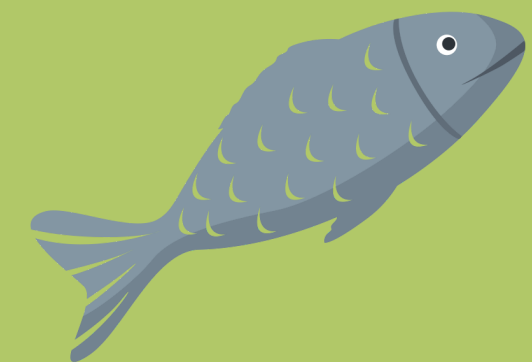
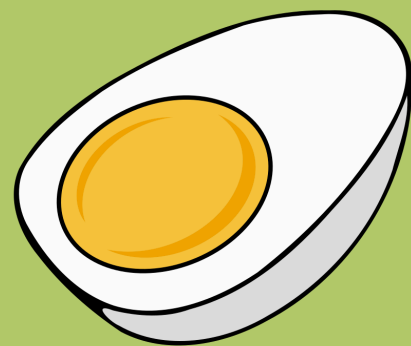
According to the formula of a balanced diet, the ratio of proteins, fats and carbohydrates should be 1:1,2:4,6 (at heavy physical labor - 1:1:5, at older age - 1:0,8:3). In this case the amount of protein in the diet is equal to 11-13% of the daily energy value, fat - on average 33% (for southern regions - 27-28%, for the northern - 38-40%), carbohydrates - about 55%.

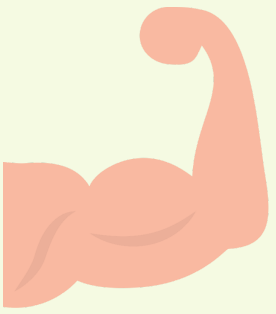




PROTEIN

Protein is the elementary building material of our body, which must be constantly renewed. Proteins make up a large part of muscles, internal organs, blood, many hormones and enzymes. Proteins perform a variety of functions in the body. Protein molecules, **enzymes**, selectively bind with other molecules in the cells and are able to catalyze reactions necessary for vital activity of the body. They are involved in: digestion; blood clotting (they initiate clot formation in case of injuries), tissue respiration, providing excitability and irritability properties of nervous and muscular tissue.



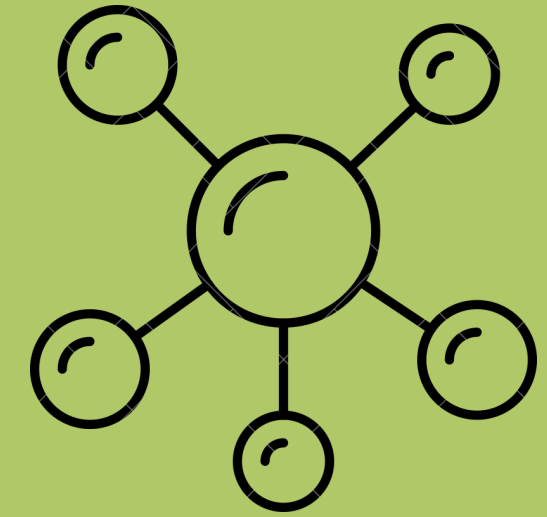


PROTEIN

Proteins play a **structural role**: muscle contractile proteins, fibrous proteins of elastic and bone framework of the body, the main protein of connective tissue – collagen.

Immunoglobulin plays a special role in the protection of the body when various foreign proteins enter it; its level increases sharply during bacterial infections.

Proteins ensure the construction of cellular structures, cells and tissues; carry out regeneration (repair) of structures of any level; synthesis of hormones, hemoglobin, myoglobin; contribute to the production of bile acids and respiratory enzymes. In addition, proteins take part in the creation of buffer systems involved in the maintenance of pH constancy of the internal environment.





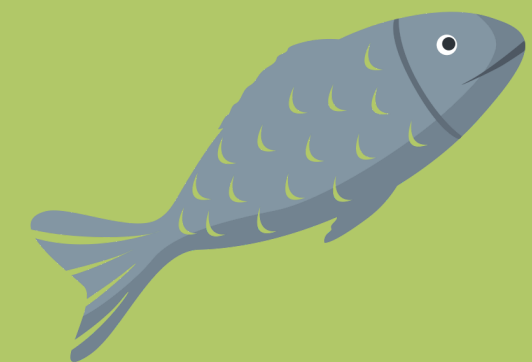
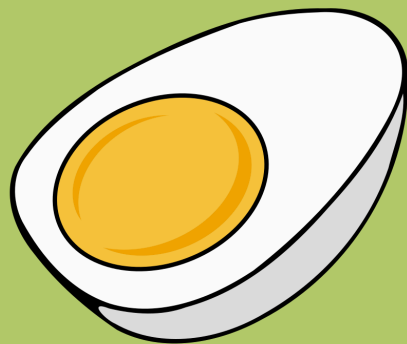
PROTEIN

Depending on the content of essential amino acids, proteins are divided into **complete and incomplete**.

Complete and balanced proteins are those that contain all essential amino acids in optimal amounts and ratios. They are found in dairy products (except cream, sour cream, butter), animal proteins, fish, meat, poultry, liver.

Complete but unbalanced proteins are those that contain all amino acids, but there is no balance, i.e. some in excess and others in insufficient quantities. These are proteins of cereals (except corn), soy, meat rich in sinews and fascia.

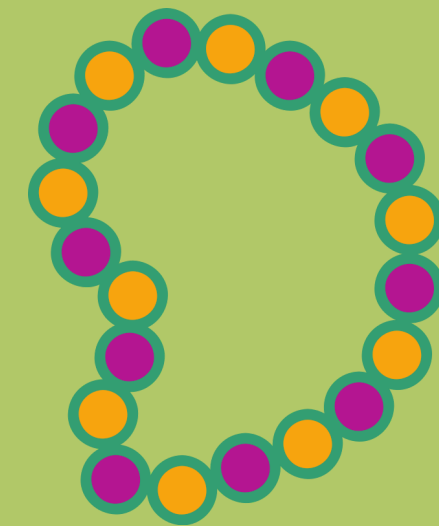
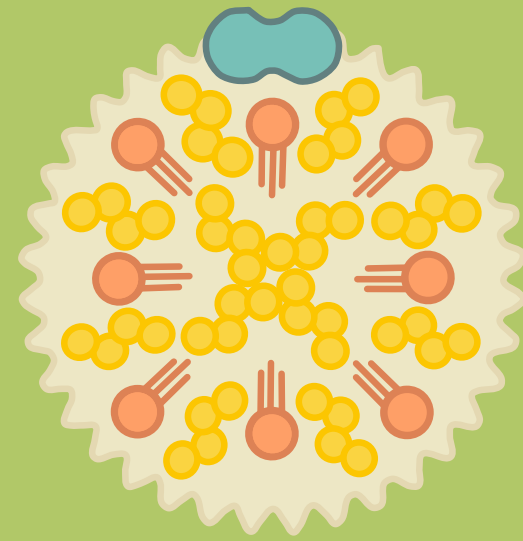
Incomplete proteins include proteins lacking essential amino acids and, in particular, such an important amino acid as lysine. Incomplete proteins of plant origin are found in corn, wheat grains, rice, gelatin, and vegetables.





FATS (LIPIDS)

Fats (lipids) are an important component of the living cell, serve as a powerful source of energy, and participate in the construction of cells and intracellular formations. Fats are part of a balanced diet. Fatty foods contain biologically active substances: phosphatides, sterols, vitamins A, E, D) and others. The oxidation of one gram of fat releases 9.3 kcal of energy, twice as much as the oxidation of carbohydrates or proteins.

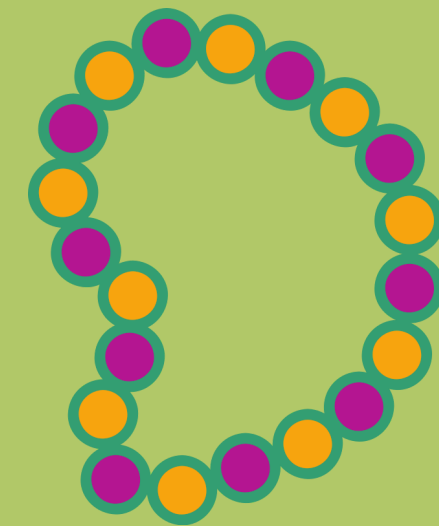
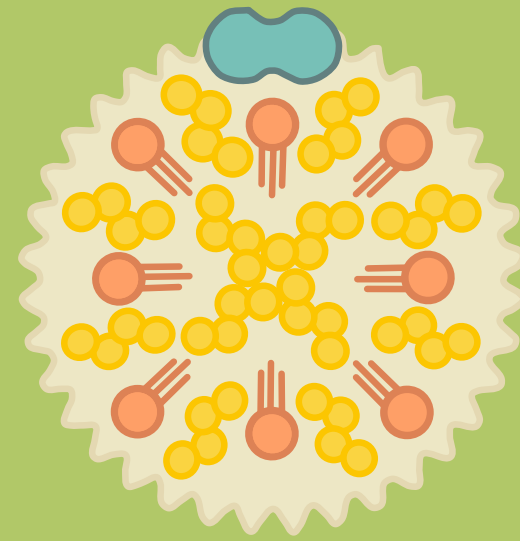




FATS (LIPIDS)

Fatty acids consist of carbon atoms bonded together and surrounded by hydrogen atoms. Fatty acids are divided into **saturated and unsaturated** according to the degree of hydrogen saturation.

Saturated are those acids whose molecule has as many hydrogen atoms as it can hold. The highest amount of saturated fatty acids (palmitic, stearic) is found in animal fats. These same foods have the highest cholesterol content. Excessive consumption of animal fats disrupts lipid metabolism, increases the level of "bad" cholesterol, contributes to its deposition on the walls of blood vessels, increases the risk of gallstone disease, obesity and atherosclerosis.



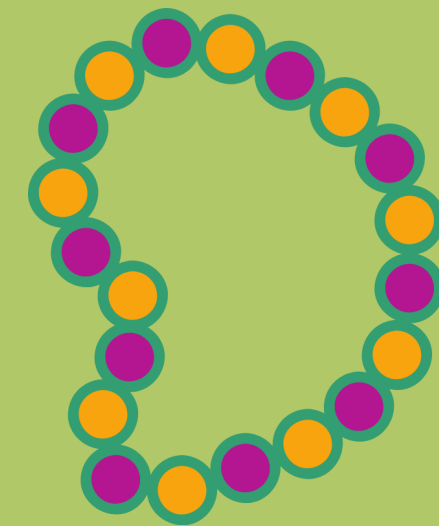
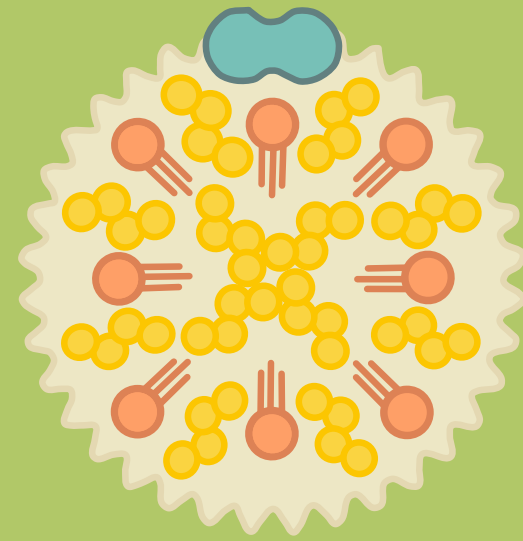


FATS (LIPIDS)

If a fatty acid molecule has fewer hydrogen atoms than it can hold, these acids are called **unsaturated**. The unsaturated nature of a fatty acid is determined by the number of multiple bonds present in its molecule.

Unsaturated fatty acids are divided into **monounsaturated**, if its molecule has one multiple bond (oleic), and **polyunsaturated**, if its molecule has several multiple bonds (linoleic, linolenic, arachidonic).

Some polyunsaturated fatty acids (PUFAs) are essential in the diet, since they are not synthesized in the human body. Such fatty acids include linoleic and linolenic acids, the main source of which are vegetable oils.





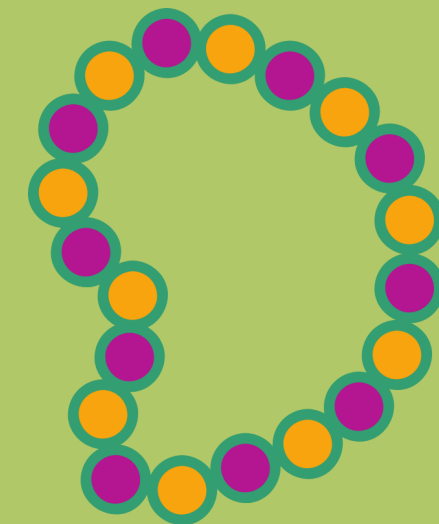
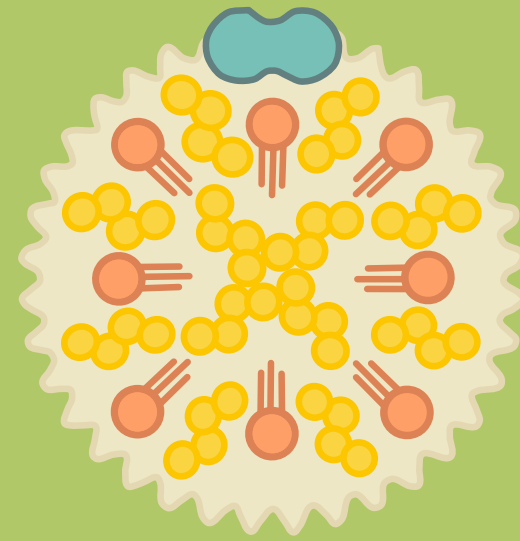
FATS (LIPIDS)

Saturated fats are substances that remain solid at room temperature. Natural saturated fats: milk, goat's milk, cheese, sour cream, meat, poultry, fish, tropical oils, nuts.

Unsaturated fats, which retain their liquid properties at room temperature. Predominantly found in plant foods such as vegetable oils, nuts and seeds.

Monounsaturated fats are found in high concentrations in: oils, avocados, nuts and seeds.

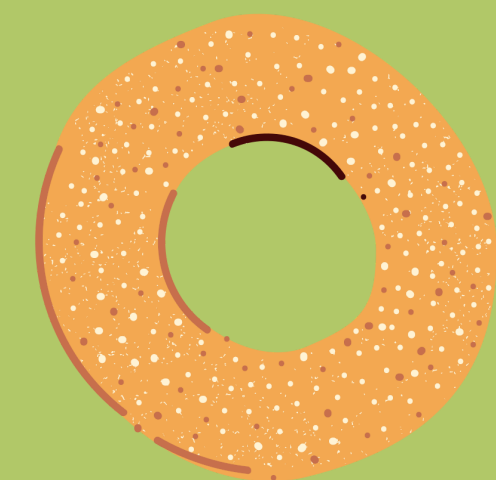
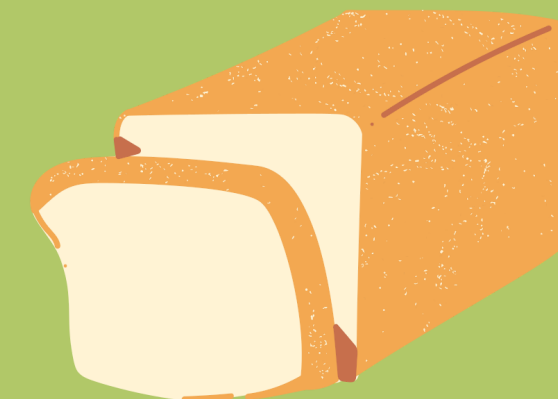
Polyunsaturated fats are found in high concentrations in: oils, pine nuts, walnuts, flaxseeds, grape seeds, oily fish.





CARBOHYDRATES

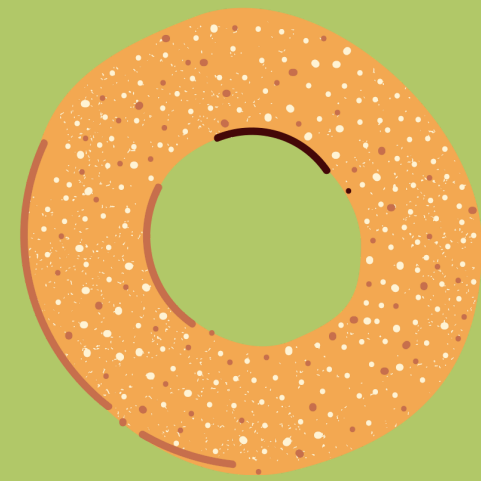
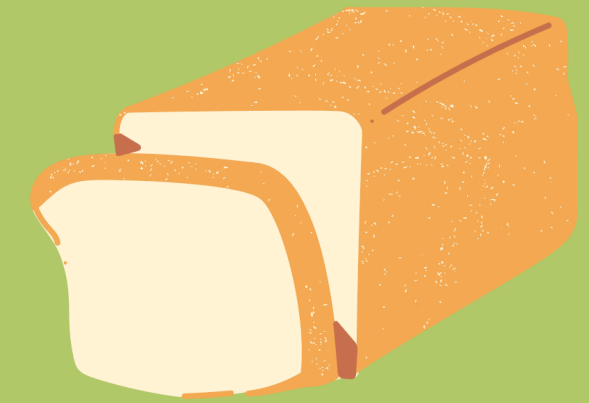
Carbohydrates are the main source of energy. More than 56% of the body's energy comes from carbohydrates. Compared to proteins and fats, they are broken down much faster and can be easily extracted from liver and muscle "depots" when needed. When carbohydrates enter the body in excessive amounts, they begin to replenish fat "depots", which leads to the formation of increased body weight.





CARBOHYDRATES

Carbohydrates are divided into three groups according to their chemical structure. The first group includes simple carbohydrates, or **monosaccharides**, such as glucose, fructose, galactose, xylose, and arabinose. The second group is made up of **disaccharides**, which consist of two monosaccharides chemically linked together: sucrose, lactose, maltose). The third group includes **polysaccharides** consisting of a large number of monosaccharides: starch, fiber, glycogen, inulin, hemicellulose, cellulose, dextrans, pectin substances.





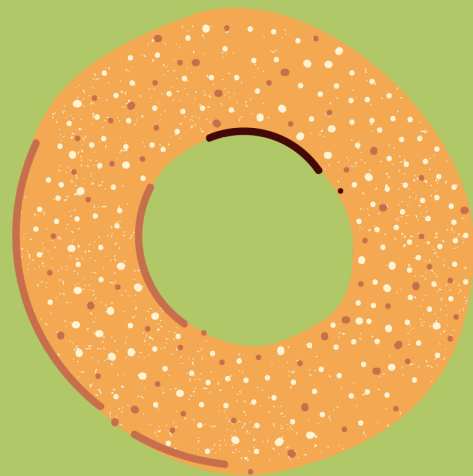
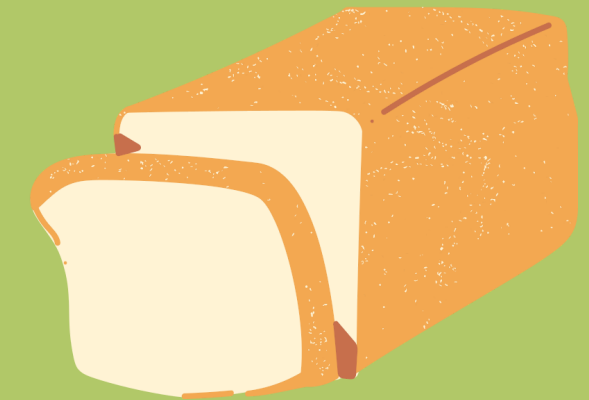
CARBOHYDRATES

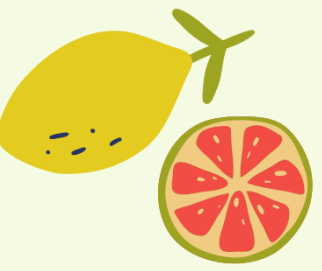
Sources of carbohydrates:

Mono- and disaccharides: glucose – honey, fruits, berries, juices; fructose – fruits, berries, juices, honey; lactose – milk and dairy products; maltose – cereal products; sucrose – sugar cane, sugar beets, table sugar, fruits, berries.

Oligosaccharides: maltodextrin – beer and bread; raffinose – legumes.

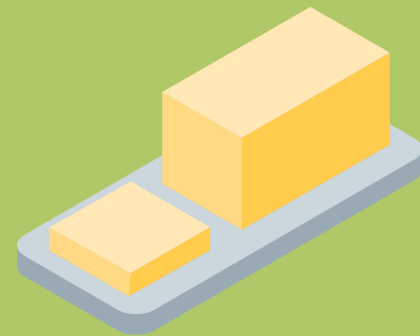
Polysaccharides: starch – potatoes, cereal products; cellulose pectin – cereals, fruits.

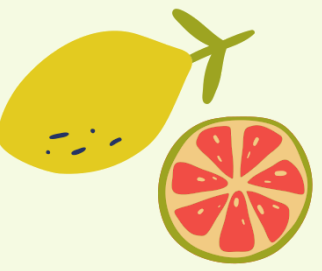




VITAMINS

Vitamins are low molecular weight organic compounds that are vitally important for humans. They are directly or after chemical modification included in a number of important biological processes in the body. Vitamins are **NOT** synthesized in the human body and come with plant foods or animal products. A number of vitamins are synthesized by the microflora of the digestive tract (K, B1, B2, B6, B12, PP, folic and pantothenic acids, biotin), so vitamin deficiency can occur when taking antibiotics. Lack of vitamins or disorders of their absorption processes lead to various forms of vitamin deficiency, up to avitaminosis. Excess of most vitamins is eliminated from the body, but some can accumulate (A, D, E, B12), but hypervitaminosis affects only vitamins A and D. Depending on their chemical structure and solubility, vitamins are divided into two classes: water-soluble and fat-soluble.

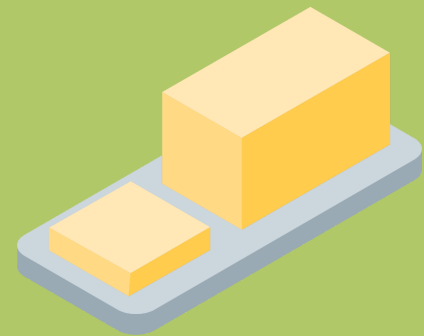


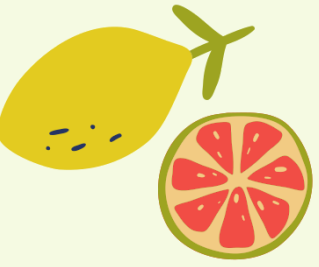


VITAMINS

Fat-soluble vitamins are a group of useful substances that are able to dissolve in a fatty environment. They take part in metabolic processes and are responsible for the health of organs and systems of the human body. Fat-soluble vitamins include vitamins A, D, E and K.

Water-soluble vitamins are vitamin C and B vitamins. They do not accumulate in the body and are eliminated after a few days, so they should be used daily.





VITAMINS

B1 (thiamine)	Plant foods, wholemeal bread, peas, beans liver.
B2 (riboflavin)	Bread from wholemeal flour, milk, cereal seeds liver, eggs.
B3 (pantothenic acid)	Liver, egg yolk, yeast, and green plant leaves. Pantothenic acid is synthesized by gut microflora.
PP (nicotinamide, nicotinic acid)	Rice, bread, potatoes, meat, liver, kidneys, etc. Can be synthesized by body cells from tryptophan.
B6 (pyridoxine, pyridoxal, pyridoxamine)	Bread, peas, beans, potatoes, meat, liver, kidneys.
H (biotin)	Liver, kidneys, milk, egg yolk, potatoes, onions, mushrooms, cauliflower. Synthesized by intestinal microflora.
B12 (cobalamin)	Meat, beef liver, milk, eggs, fish. Synthesized by intestinal microflora.



VITAMINS

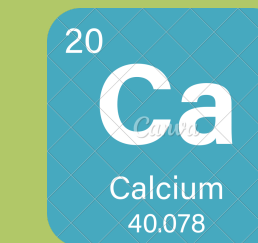
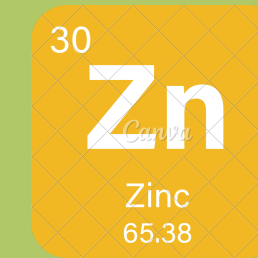
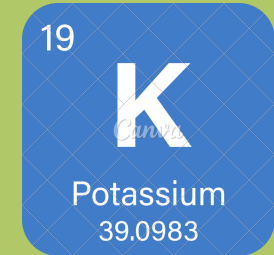
Bc (folic acid)	Green plant leaves, liver, kidneys, meat. Synthesized by intestinal microflora.
C (ascorbic acid)	Lots of vitamin C in peppers, lettuce, cabbage, rowan berries, black currants, rose hips, potatoes, lemon.
R (rutin)	Fresh berries and fruits, black chokeberry.
A (retinol)	Liver, milk, sour cream, cream, egg yolk, butter, carrots, tomatoes, beets, red pepper.
D2 (ergocalciferol) D3 (cholecalciferol)	Fish oil, butter and vegetable oil, meat, liver
E (tocopherol)	Vegetable oils (sunflower, corn, cotton, olive oil).
K1 (phylloquinone) K2 (menaquinone)	Cabbage, spinach, pumpkin, rowan berries, green tomatoes. Synthesized by intestinal microflora.
F (linoleic acid, linolenic acid, arachidonic acid)	Vegetable oils.

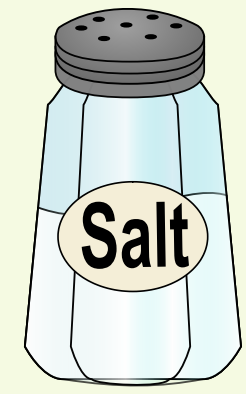


MINERALS

Minerals are low molecular weight substances, salts that support the normal functioning of the body, their absence can lead to death, and the lack – to various diseases.

Minerals are involved in all biochemical processes in the body, determine the state of the blood clotting system and muscle contractions, are an essential component of all organs and tissues. They come into the body only with food and therefore are essential components of nutrition. The composition of mineral salts in the cells of the body is maintained with exceptional consistency, and even small deviations can be a cause of ill health.

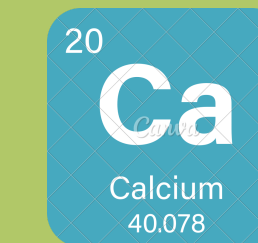
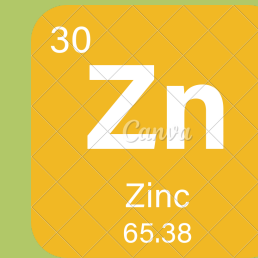
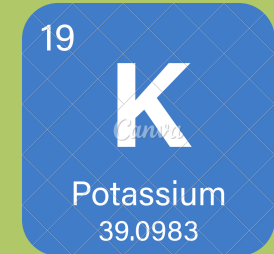




MINERALS

Macronutrients include calcium, phosphorus, magnesium, potassium, sodium, chlorine and sulfur; **micronutrients** include iron, copper, zinc, iodine, fluorine, manganese, etc.

The source of most minerals is food, and only sodium chloride is introduced into the diet additionally in chemically pure form (table salt). A varied diet using sufficient quantities of all food groups can fully provide the body with minerals. For the full and proper functioning of the body it is necessary to maintain a balanced amount of them.



**YOU ARE WHAT
YOU EAT**

