THE IMPORTANCE OF MINERALS IN HUMAN LIFE

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There is a saying among Tajiks: "Everything that is in nature is contained in man: "Yes, if you make a table with a list of chemical elements contained in our body, and compare it with the table of D. I. Mendeleev, then the human body will resemble a real chemical factory.

Mineral salts are part of hard and soft tissues, blood, lymph, bile, digestive juices and other body fluids. They are considered essential components for the normal functioning of the body and metabolism. Bone density, a clear acid-base balance, the osmotic environment inside the cells and their environment, the viscosity and maintenance of a constant pH of the lymph, bile, urine, the formation of digestive juices and enzymes, the biosynthesis of hormones are directly related to the exchange of mineral salts.

Some salts are needed by our body in larger quantities - most often in a few grams (g), while others - in milligrams (mg) or micrograms (mcg). Minerals, which in the body contains from 10-2% and above, are called macronutrients. Metals contained in the body in concentrations from 10–3 to 10–5% are called microelements (V. I. Vernadsky, 1940).

Macronutrients include those minerals that are found in large quantities in the composition of living tissue, body fluids or individual products. Their amount usually reaches from several tens or hundredths of a mg to 5–10 g per 100 g of body tissue mass or the weight of individual products. The body's daily need for macronutrients ranges from tens of milligrams to several grams.

The daily norm of some macronutrients is: potassium 2.02 g, calcium 1.02 g, silicon, magnesium 0.4–0.5 g, sodium 2.0–4.0 g, sulfur, phosphorus 1.5, chlorine 2,42

The content of trace elements in living tissue, as well as in the composition of individual products per 100 g of weight, is tenths, hundredths or thousandths of a milligram (mg).

Microelements include 15 elements - aluminum, boron, vanadium, iron, iodine, cobalt, lithium, manganese, copper, molybdenum, nickel, rubidium, fluorine, chromium, zinc. Some researchers also include strontium, silicon and selenium as microelements (B. L. Smolyansky et al., 1984). These trace elements are far from the only ones in the body. Traces of tin, mercury, arsenic, lead, titanium, silver, etc. are constantly found in the composition of blood tissues and other liquids.

Trace elements are vital elements - metals and metalloids, which are needed by our body in very small quantities. Trace elements are considered an integral part of hormones, enzymes and vitamins and are actively involved in their biosynthesis.

Therefore, ensuring a balanced normal regulation of vital physiological processes of the body is impossible without the participation of microelements.

The daily norm of trace elements is: aluminum 49.01 mg, iron 10–20 mg, iodine 0.1–0.2 mg, manganese 3–5 mg, copper 2–3 mg, molybdenum 0.2–0.3 mg, nickel 0.63 mg, rubidium 0.05–0.5 mg, cobalt 0.05–0.1 mg, zinc 10–15 mg.

As can be seen from the above data, the amounts of macro and microelements contained in the composition of fruit and berry, fruit, grain and vegetable plants will be quite sufficient to fully provide the body with these vital biological catalysts for metabolic processes. The balance of trace elements in the body is mainly maintained by their intake with plant products.

It is known that many mineral products, especially mineral water, have been used since ancient times as therapeutic agents in the treatment of diseases of the digestive tract, liver, blood, nervous system, wounds, skin, and a number of others. However, the introduction of natural or maximally purified mineral products is much worse absorbed by the body than the macro and microelements contained in the composition of plant products. Here the connection between animate and inanimate nature is more clearly manifested. Plants constantly absorb mineral salts from the soil, then, including them in the cycle of biochemical processes of their own organism, process them in a peculiar way - first of all, they release them from ballast compounds, turn them into an easily digestible form. Most often, microelements from plants pass into the composition of certain vitamins, phytohormones, phytopeptides, enzymes and a number of other organic compounds. These and dozens of other biologically active substances in the composition of plants serve as conductors and regulators of the process of absorption and full assimilation of macro and microelements necessary for our body.

Thus, through the intake of plant foods, dozens of essential substances that are close to it in nature enter the human body. That is why they are absorbed much better than pure chemicals.

Each mineral salt or chemical element has its own purpose, that is, it performs a certain physiological function in the human body. Many elements are closely related to each other, and their exchange normally proceeds only with the participation of water, organic acids, vitamins, individual hormones and enzymes. For example, calcium ions together with phosphorus are involved in the construction of bone tissue. Along with this, calcium is involved in the processes of excitability of the nervous system, muscle contractility, blood coagulation, activates a number of enzymes and hormones (B. L. Smolyansky et al. 1984).

It is a necessary component of the nucleus and membranes of cells, cell and tissue fluids, reduces capillary permeability, has a hemostatic, anti-inflammatory and antihistamine effect. The exchange of calcium in the body occurs through the nervous system, hormones, vitamin D, oxalic acid and phytin. The body contains 1.2 kg of calcium, 98% of which is in the bones. The daily requirement for calcium is 0.8–1.0 g, during pregnancy and bone fractures 1.5–2.0 g.

Oxalic acid, binding in the stomach and intestines with calcium, forms insoluble salts that are difficult to be absorbed into the bloodstream, which causes a lack of calcium in the body. From the composition of the blood, oxalic acid is mainly excreted

through the kidneys and partly through the bile. Therefore, along the way of excretion, it can also precipitate calcium salts and contribute to the occurrence of cholelithiasis and kidney stones. Spinach, sorrel, rhubarb, beets contain high concentrations of oxalic acid. Therefore, persons who have a violation of calcium metabolism, as well as who have a tendency to form gallstones and kidney stones, should not eat these vegetables in large quantities. Suppliers of calcium to the body are dairy products, beans, parsley, onions, carrots, grapes, apricots, cabbage, etc.

Phosphorus is involved in the formation of bones, the synthesis of hormones, enzymes, and the activation of vitamins. Phosphorus ions in the form of a phosphoric acid residue are part of phosphatides, phosphoproteins, phospholipids, as well as energy-rich compounds such as adenosine triphosphate, creatine phosphoric acid and other compounds that are important for the normal functioning of the nervous, endocrine, hematopoietic, cardiovascular systems and especially for metabolism.

The daily requirement of adults for phosphorus is 1.2 g, during pregnancy and lactation 1.5-1.8 g. Beans, cereals - buckwheat, wheat, oatmeal, pearl barley, - corn, bread, potatoes, carrots are products.

Magnesium, along with participation in bone formation, activates the activity of energy metabolism enzymes, mainly carbohydrates, normalizes the excitability of the nervous system and myocardial activity, has a vasodilating, choleretic effect, improves intestinal motility.

The richest sources of magnesium include wheat bran, seaweed, oats, apricots, beans, prunes, millet, peas, gentian, dill, parsley, lettuce, beets, grapes, etc.

Fluorine is essential for building bones, especially dental tissue. A lack of fluoride causes dental caries. Reliable fluoride foods are tea, pumpkin, parsley, green onions, radishes, lettuce, carrots, peaches, etc.

Sodium and chlorine - the daily norm of sodium is 2-4 g. Most often, a person consumes it in the form of table salt. The daily amount of salt needed by the body corresponds to 10–25 g. The sodium content in many foods is much lower than the body's need for this salt. Therefore, table salt, unlike other minerals, is additionally added to various products. The total amount of sodium in the body is 250 g. Its excretion from the body occurs mainly in urine (up to 45%) and then. Sodium is of great importance in maintaining osmotic pressure and acid-base balance in cells, tissues and blood in the process of intracellular and intercellular metabolism. It regulates water metabolism, promotes the accumulation of fluid in the tissues. Large doses of table salt contribute to the occurrence of edema. A salty diet is especially harmful for patients with cardiovascular, renal and hepatic diseases.

Chlorine is involved in the regulation of osmotic pressure, water metabolism and the formation of hydrochloric acid in gastric juice.

Potassium is considered a sodium antagonist, increases diuresis, promotes the excretion of water and sodium from the body. Takes part in the regulation of water-salt metabolism, osmotic pressure, acid-base balance. Together with sodium, it is involved in the transmission of nerve impulses from nerve endings to muscles. Potassium ions contribute to a decrease in the rhythm of heart contractions, a decrease in myocardial excitability. The best sources of potassium are red peppers, prunes, grapes, peas,

parsley, celery, potatoes, apples, raisins, honey, apricots, peaches, beets, pumpkins, pears and other foods.

Iron is part of blood hemoglobin, muscle myohemoglobin and a number of respiratory enzymes catalase, pyrocatalase and cytochrome. Actively participates in the process of hematopoiesis and tissue respiration. Iron deficiency causes anemia, metabolic disorders, weakness, changes in the skin, hair and nails. Vitamin C, citric acid and fructose contribute to better iron absorption. The body contains about 4 g of iron. The daily requirement for iron is 10–25 mg. Various cereals (buckwheat, semolina, barley), persimmon, quince, pears, plums, apples, spinach, cherries, strawberries, dill, green onions, etc. are considered reliable sources of iron.

Oxalic acid (sorrel), phytin and phosphates, rhubarb and some other vegetables prevent the absorption of iron, as they form insoluble salts with it.

Copper takes part in metabolism, especially in the process of hematopoiesis (together with iron, cobalt and manganese) and tissue respiration. Buckwheat, oatmeal, pearl barley, apricots, pumpkin, eggplant, gooseberries, pears, raspberries, radishes, lettuce, beets, tomatoes, lemons, grapes, and black currants are considered the main supplier of copper.

Zinc is part of the enzyme carbonic hydrase and is involved in the formation of the pancreatic hormone insulin, as well as in the process of hematopoiesis and tissue respiration. A sufficient amount of zinc is found in garlic, onions, cabbage, eggplant, potatoes, carrots, red peppers.

Cobalt is part of vitamin B12 and the pancreatic hormone insulin, which regulates carbohydrate metabolism. Its deficiency causes anemia and pancreatic disorders.

Iodine is necessary for the synthesis of the pancreatic hormone thyroxine. With a lack of iodine in food and water, endemic goiter occurs. To prevent this disease, iodized table salt is used. A sufficient amount of iodine is found in persimmons, fresh mushrooms, especially champignons, garlic, grapes, potatoes, red carrots, lettuce, and beets.

Selenium (Se) is an indispensable nutritional factor and is actively involved in various aspects of metabolism. With selenium deficiency in the diet, diseases such as toxic liver dystrophy, muscular dystrophy, exudative diathesis, encelofalomalacia (softening of the brain) occur.

It has been established that with a lack of selenium in the diet of animals, growth retardation, infertility, dystrophy of the myocardium, skeletal muscles, degenerative changes in the liver, testicles, kidneys and other internal organs occur. These and other changes respond well to treatment with selenium, as well as vitamin E. It has been proven that selenium and vitamin E together take an active part in a number of metabolic processes in the body. With their participation, methionine is converted into the sulfur-containing amino acid cysteine. Selenium is one of the natural antioxidants (antioxidants). Together with vitamin E, selenium in the body takes part in the neutralization of free radicals, inhibition of lipid peroxides - it prevents lipid peroxidation, turning them into less toxic compounds (hydroxy acids). By neutralizing these toxic products inside the cells, selenium protects them from destruction. The antioxidant effect of selenium prevents the development of tumor cells. There is

evidence that selenium has an anti-carcinogenic effect, that is, it stops the development of cancer (Zh. I. Abramov et al., 1985).

The daily requirement of the body for selenium is 30 mg. The main source of selenium supply is bakery, legumes and meat and dairy products. The content of selenium in 100 g of the product is: in rye bread - 15 mg, cereals, pasta, beans - 10 mg, milk - 20 mg and meat - 30 mg.

Thus, the achievements of recent decades in the field of studying the biological properties of mineral substances convincingly show that macro and microelements contained in fruits, vegetables and plant products are activators of a number of enzymes, participate in the process of growth and reproduction of the body, in tissue respiration and metabolic processes. , hematopoiesis, blood clotting, neuro-endocrine regulation, activity of the cardiovascular system, liver, digestive organs, protective and immune reactions, as well as in a number of other vital physiological functions of the body. Therefore, fruits and vegetables are not only useful, but also essential factors for health and longevity.

Precautionary measures. It is known that products and drugs containing salts of calcium, iron, aluminum, magnesium, etc., form insoluble salts with tetracycline (MD Mashkovsky, 1986). Therefore, when treating with tetracyclines, it is necessary to recommend to patients such fruits and vegetables that contain a small amount of these salts in their composition.

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