biomolmed laboratorium

NZOZ Biomol-Med Sp. z o.o.
ul. Huta Jagodnica 41, 94-412 Łódź, Polska
tel./fax. (+48) 42 630 49 11
biuro@biomol.pl
www.biomol.pl

bsi. ISO 9001 Quality Management
FS 609038

Analysis

of 12 elements

PREVENTIVE PROGRAMME

Test report

The sample belongs to: Example Result

Test ordered by: Example Result

The result has been issued in accordance with the PB-03 test procedure. from 01.02.2016

Dear Sirs,

In the Biomol-Med Sp. z o.o. Trace Elements Laboratory, we conduct quantitative analyses of elements contained in hair. On the basis of own research and available literature, we have established the standards of hair mineral composition for the Central European population. On the basis of data obtained from medical literature on mineral transformation from the last several years, we have defined dependencies among elements. The results of the analysis of elements in hair are interpreted by doctors cooperating with the Laboratory on the basis of the proportions among elements and their amounts.

The main objective of hair analysis is prophylactics. Supplements are not medicines and they do not replace medicines. Following a hair analysis, a patient must not independently alter the treatment prescribed by their doctor. The analysis of elements in hair is not used to detect diseases symptoms and cannot be utilised for tracing the treatment process. In case any medicaments are used, prior to introducing a nutrition programme resulting from the analysis of elements in hair, it is necessary to consult a doctor who has prescribed these medicaments. The attending physician takes the final decision on the applicable form of nutrition. Thanks to this result, it is possible to tailor a nutrition programme to individual patients' needs. In some cases, nutritional preparations may have adverse impact on one's physical well-being. In such situations, a visit at attending physician's must be scheduled. Deterioration of physical well-being may result from the processes of body "detoxification". Toxic elements and catabolites collected in tissues which are removed from the body are the direct reason for this. Thus person's well-being should soon be back to normal. During this time, the dose of the suggested nutritional preparations may be halved for a few days. Numerous doctors from different specualisations cooperate with our laboratory. The examination results and our interpretation of the mineral transformation constitute handy diagnostic tools enabling them to more precisely pinpoint the reasons for some metabolic disorders. A doctor takes the final decision regarding the correct nutrition for an examined person.

Management Board,
Biomol-Med Sp. z o.o.

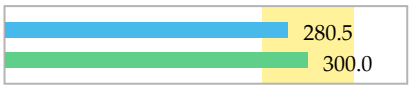
1. Introduction

The 21st century has imposed the lifestyle dominated by scientific and industrial achievements. The laws of economy decide about what we eat and how we cure ourselves. We belong to an ecologic system and participate in the matter circulation within this system. Environmental pollution contributes to changing water and soil conditions, which results in deficits of basic bioelements in our diets. Our health is determined by countless processes taking place in billions of cells and influencing the gene expression which determines our health for the years to come (Nutrigenomics). The human metabolism is "fuelled" by food and oxygen from the air we breathe. Metabolic transformations result in metabolic products used by us to maintain good health. We decide if given food will supply our bodies with all necessary nutritional substances

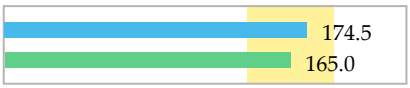
Presently, our food is highly-processed. Our senses are misled by chemical additives responsible for its excellent appearance, taste and smell. However, this food contains fewer and fewer chemical compounds necessary for proper human body functioning. The only solution for this problem is to eat food with correct diet supplements. They include: minerals, vitamins, anti-oxidants, amino acids, fatty acids, etc. The analysis of 12 elements in patient's hair is a good method to evaluate their nutrition condition. Marking 12 microelements in human hair (calcium, magnesium, zinc, iron, selenium, chromium, cobalt, silicon, mercury, aluminium, cadmium and lead) enables us to pinpoint deficiencies of basic bioelements and surpluses of toxic "metals" in a patient's body. The suggested supplementing programme will contribute to general improvement of health and well-being. We recommend searching for natural elements, i.e. natural product extracts. Such a form of diet supplements ensures high absorption and effectiveness of mineral supplementation. Deficits of certain elements in our diet (e.g. iron, zinc, manganese, silicon, chrome) may only be complemented with diet supplements. Nowadays, food supplementation is a must. The times when a doctor could say: "Ensure a diversified diet and your body will be well nourished..." are a thing of the past.

2. Elemental hair test results

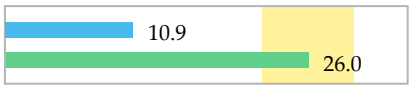
Elements



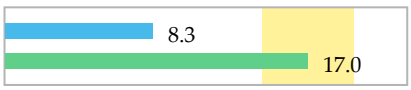
Ca (calcium) - 6 %



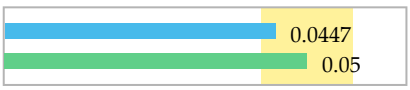
Zn (zinc) + 6 %



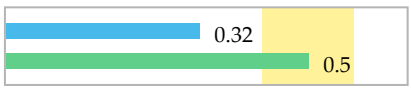
Mg (magnesium) - 58 %



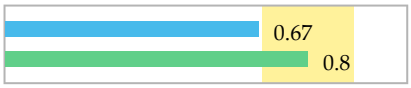
Fe (iron) - 51 %



Co (cobalt) - 11 %



Se (selenium) - 36 %

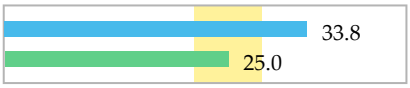


Cr (chromium) - 16 %

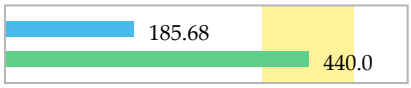
Si (silicon) - 75 %

Proportions between elements

Ca/Mg () + 268 %



Ca/Fe () + 35 %



Fe/Co () - 58 %

Toxic elements

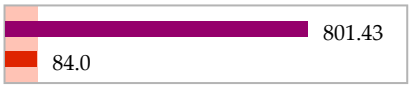
Pb (lead) Correct

Hg (mercury) Correct

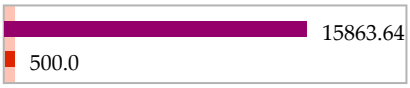
Al (aluminium) Correct

Cd (cadmium) Correct

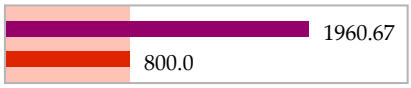
Toxic Proportions



Ca/Pb () Incorrect



Zn/Cd () Incorrect



Zn/Hg () Incorrect

Reference names (Values in ppm - mg of a given element /1 kg of hair)

- test value
- correct value
- reference range of an element
- tested value of a toxic element
- maximum value of a toxic element
- reference value of a toxic element

Sample test result authorised by:

Date of sample delivery: 2018-03-06. Test date: 2018-03-10. Authorisation date: 2018-03-12.

We hereby represent that the result is based on the sample which we received on 2018-03-06.

Chemical element analysis was performed on the Perkin Elmer ICP Optima 5300 DV and ICP MS DRC2

Uncertainty of test was based according to EA-4/16 domument.

Uncertainty values constitute uncertainties extended with certainty level of ca. 95% and coverage factor k=2.

3. Interpretation of the test result (the most important proportions between elements)

Ca/Mg Magnesium regulates the activity of calcium, which stimulates muscles to contract. Correct proportion Ca/Mg determines normal muscular tone. Calcium and magnesium are essential elements for muscles contraction and relaxation. If proportion between calcium and magnesium is inappropriate, it leads to abnormally elevated muscle tome or, inversely, decreased tone. If this inappropriate proportion is maintained over a long period of time, it may lead to disturbances of the skeletal, alimentary and nervous systems. In your case the proportion Ca/Mg indicates increased muscle tone, which can manifest as frequent cramps, feeling of constant tension, disturbances of the digestive system (constipation); and may also cause transfer of calcium within the body (transmineralisation).Transmineralisation means translocation of calcium from areas of its high content to places of lower saturation with this element.

Fe/Co Cobalt rivals with iron about access to transporting proteins in the serum. In case of low concentration of iron, cobalt may start to accumulate in soft tissues, particularly in the thyroid gland. This leads to a change in thyroid hormones metabolism, which predestines to the development of a goitre, disturbances in the heart action, and diarrhoea.

Ca/Fe The proportion of calcium to iron, similarly to the proportion of iron to copper, can reflect the course of iron metabolism in the body. Abnormal proportion of calcium to iron, at low quantity of iron, can suggest susceptibility to anaemia.

4. Supplementation scheme

Below, we recommend daily doses. The recommended substances may contain microelements and vitamins which are not identical to those indicated as needed in the chart. This is because microelements and vitamins interact and this leads to an optimum mineral composition of the organism. We recommend supplements from natural sources. Purified water (e.g. filtered in a special kit) should be used for drinking and preparation of meals.

Note

The foregoing scheme is just a proposal for doctors, who will take the final decision of the supplementation. Food supplements should only be taken with meals in order to increase their absorption. Supplementation is intended to balance the quantity of elements in organism utilising the interactions between them.

Supplement	morning	afternoon	evening
Lactobacillus acidophilus every two days, for one month	1 before meal	0	0
Vit. C 240 mg from acerola and citrus every day, for three months	1 before meal	1 before meal	0
Calcium 300 mg + Magnesium 125 mg every day, for three months	0	1 after meal	1 after meal
Magnesium 200 mg every day, for three months	1 after meal	0	0
Iron 6 mg every two days, for three months	1 before meal	0	0
Selenium 50 mcg every two days, for three months	0	1 after meal	0
Omega-3 (EPA 180 mg, DHA 120 mg) every day, for three months	0	1 30 minutes before meal	1 30 minutes before meal
Coenzyme Q10 30 mg every day, for three months	0	1 after meal	0
Silymarol (extract from milk thistle) 70 mg every day, for three months	0	0	1 after meal
Lecithine 1200 every day, for three months	0	0	1 after meal
Vitamin D3 2000 IU every two days, for three months	0	1 30 minutes before meal	0

Test result authorised by:

5. Mineral change

Ca - Calcium

Calcium is an important mineral component of the human body, responsible for many regulatory mechanisms. It is necessary for many processes: neuro-muscular conductivity, activity of muscles, normal development of the skeletal system, blood clotting, activation of enzymes, permeability of membranes. It is present in the human body in amounts exceeding any other element. About 99% of calcium is deposited in the bones. Ionised calcium plays an important role in blood clotting, maintaining normal excitability of heart muscle, skeletal muscles and nerves. Calcium regulates the activity of many enzymes, function of muscles, wound healing, hormonal transmission of stimuli, strong bones, relaxed nerves, optimism, enthusiasm, cheerful and calm mood, normal activity of the heart, normal blood clotting, iron absorption, healthy teeth, normal sleep. Calcium enables conductivity of stimuli and contractility of muscle fibres, partakes in many enzymatic processes, regulates heart rate, exerts antiallergic effect and makes biological membranes less permeable.

Occurrence: chocolate, figs, peas, beans, yoghurt, cooked kohlrabi, cabbage, spinach, fennel, tinned salmon with bones, tinned mackerel with bones, almonds, hazelnuts, fat milk, Emmental cheese, Ricottagouda cheese, orange juice enriched with calcium, Parmesan cheese, lentils, dried figs, camembert, yolk, poppy seeds.

K - Potassium

Potassium is an intracellular ion, determining the water and electrolytes metabolism. It is necessary for the synthesis of proteins and metabolism of carbohydrates. It controls the normal function of nervous and muscular systems. Potassium is the most important intracellular ion. It plays a decisive role in heart muscle activity. Intracellular concentration of potassium is essential in many important metabolic functions, including the biosynthesis of proteins. Potassium and sodium control the electrolytes and acid-base balance, play the main role in conductivity of stimuli in all nervous cells. Potassium determines: proper oxygenation of the brain, function and transport to the cells, function of kidneys, water metabolism, normal heart activity, carbohydrates metabolism. Potassium is especially important in muscle fibres contractions, synthesis of proteins, glycogen and glucose metabolism.

Occurrence: avocado, bananas, broccoli, dried apricots, beetroots, wholegrain bread, beans, lima beans, dried cooked beans, cooked, soya beans, peas, skimmed yoghurt, pumpkin, cabbage, salmon, mackerel, cantaloupe melon, almonds, skimmed milk, dried mackerel, peanuts, pumpkin seeds, lettuce, celery, herring, snapper – south seas fish, fresh orange juice, tomato juice, asparagus, cooked spinach, prunes, cooked potatoes, baked potatoes.

Zn - Zinc

Zinc plays a lot of important functions in the body,. It is a component of many enzymes, and their activation, takes part in the metabolism of proteins and carbohydrates, and possibly also lipids. Absorption of zinc by the human body differs depending on the food and interactions between zinc and other elements. Zinc plays an important role in the reproductive system, in particular in men, and acts as a detoxicant (antagonist of cadmium and lead). The antagonism Zn-Cd and Zn-Cu is especially metabolically important. Calcium and magnesium may also limit absorption of zinc. It is necessary for the synthesis of proteins, it is a component of digestive enzymes, participates in the storage of insulin and enhances the immune system functions. Zinc plays a role in maintaining the balance between other trace elements, such as manganese, magnesium, selenium and copper. Positive zinc effects include general improvement of metabolism, enhancement of wound healing, and in particular skin defects, improvement of mental abilities, protection of the macula lutea form degenerative changes.

Occurrence: veal, cooked meat, pumpkin and pumpkin seeds, lobster, baked turkey, cooked crabs, beef sirloin, nuts, seeds: pumpkin, sunflower; raw oyster without shell, smoked oyster, cheese, herring, cereal, wheat bran, beef, beef and pork liver, snails, cooked veal liver, eel, cereals, yolk.

Mg - Magnesium

Magnesium plays a role in various metabolic processes. It plays an important role in muscle contractions (including the heart muscle) – maintains normal heart rate and neuro-muscular excitability (antagonist of calcium). It enhances blood coagulation process (stabilises platelet and fibrinogen function). It stimulates immune reactions of the body, and normal development of the skeletal system, exerts a sedative effect. It is a microelement necessary for normal function of cells. Vitamin B6 (pyridoxine) increases the synthesis of GABA, which is a neurotransmitter, but also enhances absorption of magnesium from the alimentary tract. Due to synergistic activity of both components, the preparation eliminates anxiety (psychic or somatic), but does not affect learning and concentration. It prevents stress, headaches and other pains. Magnesium is necessary for normal metabolism of calcium and vitamin C. It influences the metabolism of sodium, potassium and calcium. Magnesium is necessary for the synthesis of proteins, protects capillaries form damage, takes part in the synthesis of numerous enzymes and plays a key role in energetic biochemical metabolism of carbohydrates. The above listed processes are impaired in magnesium insufficiency, which is the reason of many other metabolic dysfunctions, mainly affecting the muscle, including the heart muscle. Magnesium is also important in the prophylactics and treatment of many diseases. It prevents nervous hyperexcitability, depression and vegetative dystonia.

Occurrence: bananas, brewing yeast, beans, peas, buckwheat, cocoa, chocolate, crabs, almonds, brazilian nuts, nuts and seeds, hazelnuts, walnuts, peanuts, chicken, cashew nuts, wheat bran, sausages, pumpkin seeds, soya products, sea fish, lentils, spinach, ham, soya, pork, beef, potatoes.

Fe - Iron

Iron is a part of many enzymes and metalprotein compounds, which take part in oxidation-reduction processes. It is the core of haemoglobin and myoglobin, and many other ferroporphyrins. Some part of iron is utilised by cells of the erythroblast system in the production of haemoglobin, the rest is stored as ferritin, mainly in the liver and spleen, and in other organs. The transporting protein for iron is transferine. Iron stored in the body is maintained in a dynamic balance with its amount in the serum. Iron reserves may be present in combination with hemosyderine, which, contrary to ferritin, shows weak ability to release iron and poor solubility. Iron is a component of erythrocytes, protein (haemoglobin) transporting the oxygen and protein storing the oxygen in muscle (myoglobin). Iron regulates: the activity of enzymes, the condition of erythrocytes, cellular respiration, normal heart function, cell divisions, hormonal metabolism, development of the muscles, condition of immune system, oxygenation of cells. Absorption and metabolic function of iron depend on other elements. Antagonistic activity towards iron is showed by cadmium (Cd), manganese (Mn), lead (Pb) and zinc (Zn). In case of copper the relation is more complex, often synergistic, as both elements are involved in oxidation-reduction processes. Phosphorus inhibits the absorption of iron, as iron phosphates easily sediment in various conditions.

Occurrence: wholegrain bread, peas, beans, lentils, mushrooms, mussels, meat e.g. sirloin, ham; nuts, dried fruit, pumpkin seeds, liver.

Cu - Copper

Copper is one of the most stable components of the human blood. Its

serum concentration ranges within 100 - 130 mg/100 ml. It is slightly higher in women than in men. Copper, activating the enzyme necessary for the development of erythrocytes, determines the normal function of the haemopoietic system. It also controls – via the synthesis of dopamine - the development of the nervous system and – via the synthesis of collagen and elastin - the regeneration of the connective tissue. In addition, copper together with zinc repair the damage done by free oxygen radicals. Copper is a component and activator of enzymes in numerous chemical reactions. Copper is necessary for the absorption and metabolism of iron. It plays a part in the oxygenation of vitamin C. The main biological role of copper is that it is a component of different enzymes of oxygenation – reduction processes, for example cytochrom oxidase in animals. It also stimulates the activity of hemoglobin. Copper is a component of ceruloplasmine (serum protein). In this form it is transported around the body and regulates the metabolism and transportation of iron. It influences the metabolism of lipids (e.g. cholesterol) and determines the properties of myelin cover of nervous fibres. Copper is necessary for both normal metabolism of the connective tissue, and the functioning of brain cells. Deficit of copper affects the above described processes, which manifests as diseases - anemia, growth and fertility disorders, nervous system disturbances (headaches), circulatory system diseases, and also osteoporosis. In cells copper can be found mainly in mitochondria and nucleus. Its content in particular organelles also depends on the type of tissue. Due to its ability to make compounds with nucleic acids it can cause permanent changes of their structure, and thus change of their biochemical and genetic properties. Copper easily binds to various proteins, especially to macromolecular proteins and proteins containing sulphur. Metalothionine as a protein rich in sulphydryl groups shows large capacity in relation to copper is responsible to a considerable degree for its increased liver content.
Interactions between copper and various elements can lead to its secondary deficit or toxicity. The most common antagonism can be seen between copper and zinc (Cu-Zn), which is responsible for many symptoms connected with copper deficit. Relative increase in the content of zinc and increased elimination of copper causes various metabolic disorders, mainly abnormal metabolism of lipids, leading to coronary heart disease or mental disorders. In animals loss of equilibrium between copper (Cu) and molybdenum (Mo) is frequently observed, related to additional influence sulphur. Increased molybdenum content eliminates copper form metabolic cycle, leading to symptoms of copper deficit. The antagonism copper - molybdenum (Cu-Mo) is intensified by sulphur. Molybdenum increases the binding of copper into non-absorbable compounds. Synergism between copper and iron (Cu-Fe) is enhancing many enzymatic processes, and particularly for the synthesis of hemoglobin. Calcium positively affects the absorption of copper by the organism, even though in general the absorption of copper is better from foods of acidic pH.
Occurrence: mushrooms, meat, seeds, kidneys, nuts, dried fruit, tomatoes, wholegrain products, brown rice, liver, green leaf vegetables, potatoes.

Cr - Chromium

Chromium is indispensable for normal development of humans and animals. In general its content in diet and fodders covers the requirement, which for adults ranges from 50 - 200 mcg/day. Its daily dose consumed with food in Great Britain is estimated as 320 mcg, and in United States as 50 mcg, which may not cover the requirement. Chromium stabilizes the level of sugar in the blood. It lowers the level of cholesterol and triglycerides in the blood, controls the feeling of hunger, stimulates energetic transformations and synthesis of fatty acids. It stimulates the transport of aminoacids to cells and the activity of insulin via glucose level, and increases the tolerance to glucose. Chromium is commonly present in tissues, though in exceptionally small quantity. The content of chromium in the organism of an adult male is less than 6 mg. If its content in animal fodder is very low, growth and survival may be affected. These effects disappear if the diet is supplemented with 5 ppm of chromium. On the base of observation decreased glucose tolerance was seen in animals fed on diet poor in chromium; this symptom disappeared after administration of chromium. Chromium appears in animals at +3 and +6 degree of oxidation. Because of the tendency to reduction of chromium, cation Cr3+ prevails in the majority of tissues apart from the liver. Chromium binds to nucleic acids and is concentrated in liver cells. This metal plays an essential role in the metabolism of glucose, some proteins and lipids. It is a component of enzymes such as trypsine and stimulates the activity of other enzymes. In particular interesting and unexplained is its role in the metabolism of cholesterol. Increase of cholesterol in serum in older persons is supposed to be connected with a decrease of chromium content in the circulatory system, while the role of chromium in the metabolism of glucose is closely connected to the activity of insulin. Excessive consumption of sugars accelerates its elimination from the body. Elimination of Cr3+ is considerably smaller than C6+. Some illnesses, especially of the circulatory system, affect the metabolism of chromium.
Occurrence: black pepper, brewing yeast, grapefruit, mushrooms, artichoke, molasses, meat, nuts, seeds, peanuts, oysters, seeds, wholegrain products, wheat and bran, raisins, brown rice, asparagus, plums, veal liver, yolk.

Co - Cobalt

Usual content of cobalt in the body is 18,7 μmol and its serum concentration 2+/-1 nmol/l. Daily requirement is below 10 μg (below 0,2 μmol). In humans cobalt appears mainly in form of vitamin B_{12}, the cofactor of two most important enzymes: methylmalonyl-CoA isomerase and ribonucleotide reductase. Vitamin B_{12} participates in the formation of coenzymes transporting monocarbonic fragments and incorporating them in newly synthesized purine and pirymidine compounds. Thus, the function of vitamin B_{12} (and indirectly of cobalt) is closely connected with the synthesis of nucleic acids.
Occurrence: vitamin B12, aloe.

Se - Selen

Selen is an indispensable component of animal organisms and it is present in all cells. The highest content of selen is in the liver, kidneys, pancreas. Its biological function is mainly connected with glutathione peroxidase (GSHPx), of which it is a component. This enzyme plays a crucial role in the protection against membrane lipids oxidation and in the metabolism of hydrogen peroxide (H_2O_2) and lipid hydroxyperoxides. Selen activity in the blood is similar to that of vitamin E (alpha tocopherol), and selen may replace it in metabolic processes on the cellular level. As an antioxidant, selen protects cellular membranes from the generation of free radicals. Due to this it reduces the risk of cancer, diseases of the heart and blood vessels. Selen is indispensable for normal course of metabolism. It is very important for proper immunological function.. It is essential for the functioning of the immune system, normal growth, reproduction and in prevention of various illnesses. It plays an important role in the transmission of impulses in the central nervous system. Selen is prevalent in animal organisms. It is present in highest concentration in the cortical layer of kidneys, pancreas, pituitary gland and liver. Most of selen contained in the organism is labile. The content of selen in food is variable and dependent on the content of selen in the soil. Some diseases in animals developed on nutritional background react to the administration of selen or vitamin E, suggesting close relationship between these two components. Selen is regarded as a remarkably toxic element. If selen is present in diet in concentration about 5-15 ppm, it becomes highly toxic. However, in concentrations below 3 ppm selen accelerates growth and prevents many diseases. It appears often in compounds with aminoacids, cysteine (selenocysteine) and methionine (selenomethionine). The role of various,

recently determined, compounds of selen with proteins has not been definitely established, but current investigations suggest its important role in RNA functions and in the activity of thyroid gland hormones, regulating the transformation of active and nonactive forms of iodothyronine. The content of selen in the blood of children is about 50 mg/l and is probably responsible for disturbances in the metabolism of thyroid hormones in girls. Bioavailabilioty of selen is individual and depends on the form in which it occurrs and type of food. Selenates and amine selene compounds are absorbed the most easily. Assimilation of selene is increased from protein rich diet and vitamin rich diet (mainly E, A, C), and difficult at increased quantity of heavy metals and sulphur. Deficit of selen is connected mainly with the heart muscle damage (Keshan disease) and diseases of the skeleton (Kashin-Beck disease). Recently numerous reports have suggested a relationship between the deficit of selen and development of neoplasms, and also with the diseases of circulatory system. A study comprising inhabitants of two neighbouring housing estates near Belgrade, with different cancer morbidity, showed that the soil, food and serum of inhabitants suffering form cancer contained significantly less amounts of this element (Se in serum: range 15,238, mean 26 mg/l) than those of healthy people, where the range of selen concentration was 20,6-69, average 39 mg/l. The concentration of selen in the serum of Poles is 50-60 mg/l, and in some regions it reaches even >100mg/l. Interactions between selen and trace metals are of physiological significance. Selen compounds of metals are easily formed in living organisms (e.g. Cd. Hg, Pb, Ag, Ta). Due to their poor solubility they do not participate in biochemical processes. As a result, selen can deactivate toxic excess of metals, which are deposited mainly in parenchymatous organs. The effect of selen on increased deposition of metals, particularly mercury and lead in the intracellular substance in kidneys and liver can be harmful for general metabolism. As the above mentioned metals show a susceptibility to bind to low-molecular proteins, they limit the assimilation of selen by the organism. An increase of the content of this element in tissues (e.g. heart, liver, kidneys) causes secondary decrease in the concentration of magnesium, manganese and copper. Subcutaneous injection of selenate sodium solution caused essential decrease in the concentration of copper in the serum of sheep. Selen is a component of one of the thyroid hormones, which explains its synergistic function in relation to iodine. The presence of sulphur decreases toxic activity of selen.

Occurrence: garlic,brewing yeast, mushrooms, eggs, wheat wholegrain flour, mussels, molasses, meat, roasted sunflower seeds, brazilian nuts, cooked oysters, prepared wheat (blown), brown rice, cheese, shellfish, asparagus, tuna, liver, cooked poultry liver.

Al - Aluminium

So far aluminium compounds have been regarded harmless for health. Alkaline compounds of aluminium have been used in the treatment of hyperacidity, particularly in ulcerous disease. Aluminium is absorbed from the alimentary tract and accumulated in tissues. Increased content of aluminium in tissues is harmful for health. Symptoms of excessive aluminium accumulation in the brain tissue can lead to disturbances of memory and body balance. Aluminium decreases the activity of the central nervous system, binds with DNA of nervous cells, and blocks the most important enzymes of the central nervous system: Na/K ATP-ase and hexokinase, decreases reverse absorption of basic neurotransmitters in the brain: dopamine, noradrenaline, serotonine. Recent studies have revealed a relationship between aluminium accumulation and Alzheimer and Parkinson disease. Sources of aluminium are vegetables form acidic soils (in Poland about 60% of soils is acidic). Additionally this process is intensified at the deficit of magnesium and potassium in the soil. Aluminium appears in alkylating drugs containing its compounds, in tap water (if it contains increased quantities of aluminium), in bread with preservatives. Aluminium vessels can be a source of this metal.

Pb - Lead

Lead poisoning manifests as: lack of appetite, colics and cramps, arterial hypertension, nervousness. Lead blocks the enzymes participating in the synthesis of haemoglobin, accelerates destruction of erythrocytes, and incorporation of calcium into bone structure, which leads to their fragility. It blocks the enzymes of the central nervous system participating in the synthesis of neurotransmitters (nervous transmitters), affects the absorption of iodine indispensable for the normal function of the thyroid. Lead can enter the human body through the respiratory system and alimentary tract, and the degree of its accumulation is dependent on many factors, including individual properties and composition of food. Average intake of lead by adults estimated for various countries is 320-440 mg/day.

Cd - Cadmium

Practically cadmium is not present in the human body at birth, but accumulates gradually due to its exceptionally long half-time in the organism, possibly between 16 and 33 years. Generally the content of cadmium in the human organism is about 30 mg, from which 10 mg resides in the kidneys, and 4 mg in the liver. Studies conducted on animals revealed the presence of antagonism between cadmium and zinc, and interactions between cadmium, iron and copper. Poisoning with cadmium causes: bones deformations, growth disorders, infertility, neoplasms, skin tumors. Cadmium blocks the enzymes of Krebs cycle (cycle responsible for the production of energy), directly damages nervous cells, inhibits the release of acetylcholine in the central nervous system and accelerates its decomposition (activates cholinesterase). Cadmium affects the transformation of calcium and phosphorus in the bones – causes rarefication of the bones. It expels zinc from arterial walls, decreasing the elasticity of blood vessels, accelerates the development of atherosclerosis and hypertension. Cadmium is antagonistic to zinc, and impairs the synthesis of digestive enzymes and synthesis and release of insulin, requiring the presence of zinc. Cadmium impairs the activity of prostate gland, accumulates in the kidneys, affecting their hormonal and excretory function. At zinc deficit cadmium accumulates in the liver and kidneys. If this process is prolonged, it may lead to growth disorders and infertility, renal functions disorders and deformations of the skeleton. Absorbed cadmium (through the alimentary tract and partly via the respiratory system) creates complexes with proteins (e.g. low-molecular metalthionine), with which it is easily transported, and deposited mainly in the kidneys and liver. Cadmium is an inhibitor of phosphatase and enzymes containing sulphydryl groups, causes disturbances in the metabolism of proteins and vitamin B_1. Interactions of cadmium with Zn, Cu and Se are based on mutual expelling from complexes with metalthionine. This is the reason why an increase of the content of these elements weakens toxic activity of cadmium. Antagonism cadmium/iron (Cd/Fe) is connected with the antagonism cadmium/calcium (Cd/Ca). It causes increased elimination of calcium. Resistance to toxic activity of cadmium is hereditary and it is connected with individual properties of metabolism.

Hg - Mercury

Poisoning with mercury manifests as: sight and consciousness disorders, states of confusion and disorientation, frequent lapses of memory, nervousness. About 10 % of mercury introduced into the organism with food, through the skin and lungs gets to the brain and accumulates there. It expels zinc from the brain tissue, and it penetrates to cellular nuclei and destroys the genetic material.

Si - silicon

In natural environment, it can be found mainly as silicon dioxide and silicates. Silica occurs very often in the environment, mainly in the form of sand. Apart from carbon, silicon is the basic element of life. In the form of orthosilicic acid, it is essential for the correct functioning of

human body. Human body contains app. 6-7g of Si. It is excreted with urine, in combination with calcium and magnesium cations. Properties. Silicon is an element of many changes concerning many other elements. It supports transformations of calcium, magnesium, phosphorus, copper, zinc, and sulphur. It competes with aluminium, cadmium, lead, mercury, chromium, strontium, and potassium. Silicon assists in the excretion of toxic substances from cells. It is found mainly in the connective tissue (e.g. in sinews, cardiac valves, skin, mucuous membranes, and blood vessel walls) and in bones. Thanks to silicon, people have fit joints, strong bones, and the efficient cardiovascular system. Silicon enhances protective properties of the body against infections. It assists in regeneration of skin, improving its general appearance. It limits hair loss, accelerates hair growth, and strengthens nails. It inhibits premature ageing. As an aluminium antagonist, silicon may reduce risk of the Alzheimer disease. Deficiency. Silicon is the most important element in the synthesis of mucopolysaccharides in the creation of cartilaginous tissue; it is also essential for correct production of collagen. It has been demonstrated that deficiencies of silicon in children reach even 50% nowadays. This creates favourable conditions for the development of rickets, skin diseases, and disorders in the development of the lymphatic system.

Dose. Human body needs 20-40 mg of silicon daily. Higher doses are required by pregnant women, people after bone surgeries, and elderly people.

Occurrence. In food, silicon occurs in the form of orthosilicic acid. It can be found in oats, millet, and barley, mainly in bran and grain husks. Lots of silicon can be found in field horsetail. There is hardly any silicon in products manufactured based on refined flour. Semolina, which is intended mainly for children, does not contain this element either.

The result has been issued in accordance with the PB-03 test procedure. from 01.02.2016.

The result was verified by: dr n. med. Sławomir Puczkowski on: 2018-03-21.

Analiza 12 pierwiastków

NZOZ Biomol-Med Sp. z o.o.
ul. Huta Jagodnica 41, 94-412 Łódź, Poland
tel./fax. (+48) 42 630 49 11
biuro@biomol.pl, www.biomol.pl