biomolmed laboratorium

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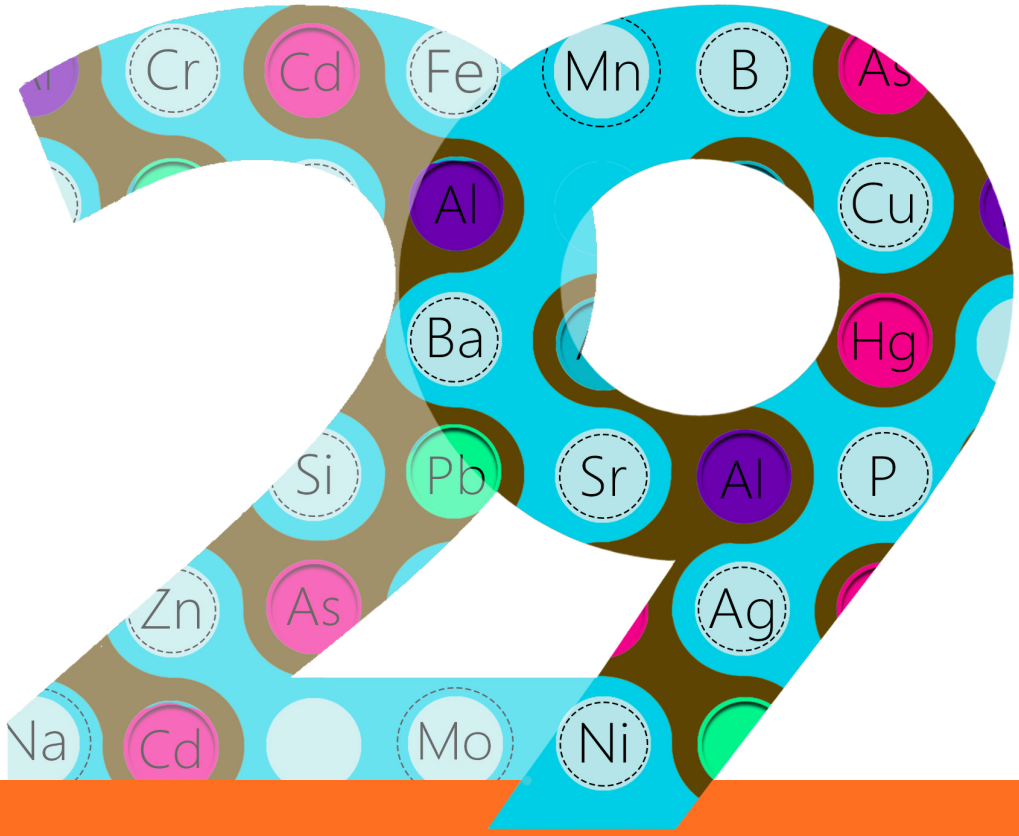
bsi. ISO 9001 Quality Management
FS 609038

Elemental
Hair Analysis

HEALTH PROGRAMME



Test report: Example result

The sample belongs to: Example result

Test ordered by: Example result


RZETELNA Firma

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 mineral metabolism test results you receive are complementary to biochemical analyses. Elemental analysis, in combination with medical interview or examination, is a valuable source of information that helps to fully assess the patient's health condition and identify the characteristics of the metabolic type. The rate of metabolism may be affected by a variety of external factors, e.g. physical or mental work, emotional states, low or high ambient temperature, food digestion and absorption, increased levels of certain hormones in blood, especially thyroid gland and adrenal medulla hormones. Appropriate analysis of medical interview (or patient questionnaire) and elemental test findings helps to identify the optimal organism nutrition.

If used in the description, such words as "increased" or "heightened", etc., should not be interpreted as indicative of a pathology, but rather as a reflection of the metabolic processes status. Correct concentrations of elements and proportions between them may only be treated as one of the parameters defining a deficit or surplus of the given element. Mineral metabolism tests have been applied for 30 years by many research centres around the world.

Mineral metabolism test results may:

- show vulnerability to certain diseases
- support therapeutic interventions
- explain the disorders accompanying a number of pathologies.

Based on the test results, we give you individual dietary recommendations and supplementation scheme (vitamins-minerals-antioxidation), with a view to improving your health condition..

2. The basis of hair analysis result interpretation

The human organism is a biochemical factory, where production is going on continually. In each cell, catabolic processes (combustion) take place, generating energy indispensable to maintain all physiological functions of the organism

The equilibrium between catabolism and anabolism is referred to as metabolism. Within one year, an adult consumes over 1 ton of food, containing ca. 70% of water. The food contains carbohydrates, fats and proteins. Carbohydrates and fats are the basic sources of energy generated as a result of catabolic processes. Protein in the basic source of material utilized in regeneration of our organism in anabolic processes.

In the whole organism, only the nervous and muscular systems remain unchanged throughout our life. All other tissues are "exchanged". Depending on the metabolic rate, new generations of cells may develop every few days, weeks, or months. The quality of the regenerated tissues is dependent on genetic and external factors, and first of all on the nutritional pattern. The efficiency of regeneration of our internal organs determines the aging rate of our organism. As genetic information is more and more deteriorated in the next generations of cells (because of the lack of enzyme; telomerase, the new cells receive shortened chromosomes) our life span is limited. If the function of all our internal organs remains optimal, we could age as long as our brain and nervous system is able to live – i.e. 110 -130 years. We cannot influence directly the genetics yet, but we can counteract the potential hazards with an appropriate diet. On the other hand, an inappropriate diet may influence our genetics, e.g. by free radical mechanisms. Incorrect nutrition impairs the function of the antioxidative barrier, thus accelerating aging due to free radical reactions. Each organism of a particular species has strictly defined characteristics, which determine its functions. Within the same species, there are significant physiological and anatomical differences. They are determined by different environmental and genetic factors. As a result, each organism is a biochemical individuality with distinct nutritional needs.

How can one's own biochemical individuality be defined and determined?
How can we assess objectively our individual metabolic needs?

The search for a definition systematizing the variety of the human race has been going on for ages. The starting point was always the specific mode of biochemical energy utilization at the physical and emotional level. Recent studies point to the activity of the particular endocrine glands (thyroid and adrenals).On that basis, the following metabolic types can be distinguished.

adrenalin type

a sturdy person with athletic figure, serene, patient, sympathetic; requires physical activity, enhancing oxygenation of the organism, to remain healthy; a person who likes dominating others; high-protein diet and three meals a day are the best for this type; gaining weight, such a person develops abdominal obesity which can affect significantly the lipid profile (calcium metabolism predominates in the organism)

thyroid type

a quick-acting person, energetic, impatient, enjoying intensive activity, which often leads to exhaustion and discouragement, to regain the top form with time and be able to work hard again; owing to quick combustion processes, such a person can eat a lot, remaining slim and fit; functions well eating even once a day; high intensity of life often leads to disturbances in thyroid function; if such a person gains weight, losing excess kilograms is difficult (phosphorus metabolism predominates in the organism).

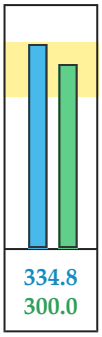
pituitary type

a person thin and slim, indifferent to the needs of the organism; an intellectual type, with predominance of logical

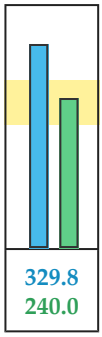
thinking; alternating periods of occupational activity or reluctance to work and depression; vegetarian diet and a few, i.e. 5-6 small means a day are good for this type; a person susceptible to addiction to all stimulants (sulfur metabolism predominates in the organism).

3. Elemental hair test results

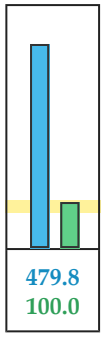
Elements



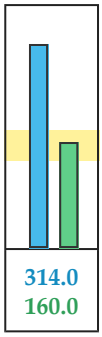
Ca (calcium)
+ 12 %



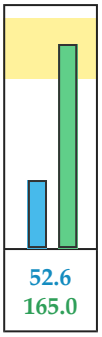
Na (sodium)
+ 37 %



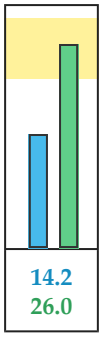
K (potassium)
+ 380 %



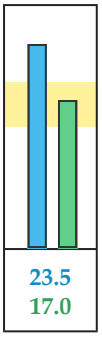
P (phosphorus)
+ 96 %



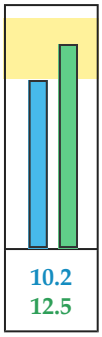
Zn (zinc)
- 68 %



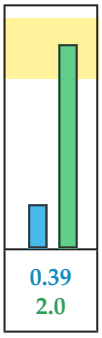
Mg (magnesium)
- 45 %



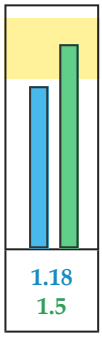
Fe (iron)
+ 38 %



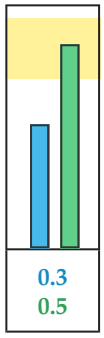
Cu (copper)
- 18 %



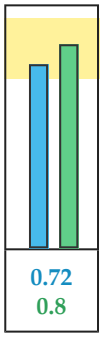
Ni (nickiel)
- 80 %



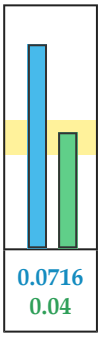
Mn (manganese)
- 21 %



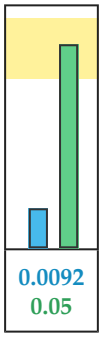
Se (selenium)
- 40 %



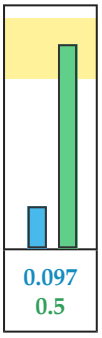
Cr (chromium)
- 10 %



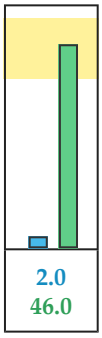
Mo (molybdenum)
+ 79 %



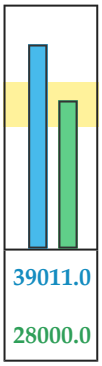
Co (cobalt)
- 82 %



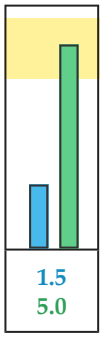
Ag (silver)
- 81 %



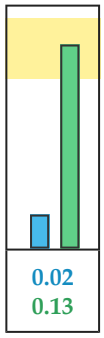
Si (silicon)
- 96 %



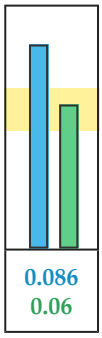
S (sulfur)
+ 39 %



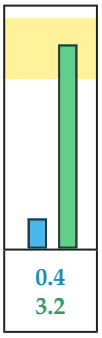
I (iodine)
- 70 %



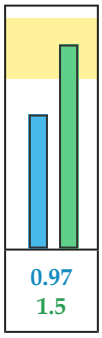
Sn (tin)
- 85 %



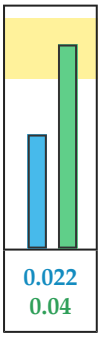
V (vanadium)
+ 43 %



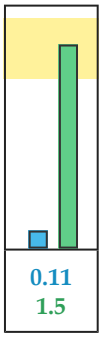
Sr (strontium)
- 87 %



B (boron)
- 35 %

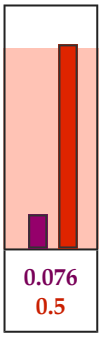


Li (lithium)
- 45 %

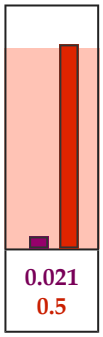


Ba (barium)
- 93 %

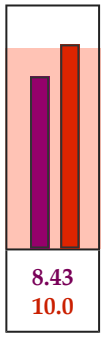
Toxic elements



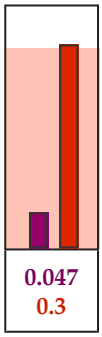
As(arsenium)



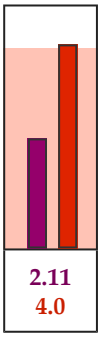
Hg(mercury)



Al(aluminium)



Cd(cadmium)

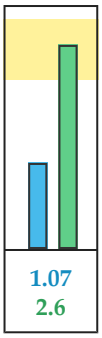


Pb(lead)

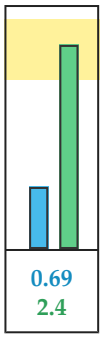
Reference names (Values in ppm - mg of a given element /1 kg of hair)

- 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

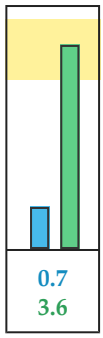
Proportions between elements



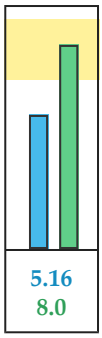
Ca/P
- 59 %



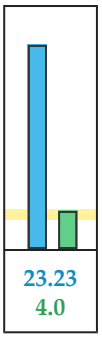
Na/K
- 71 %



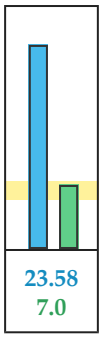
Ca/K
- 81 %



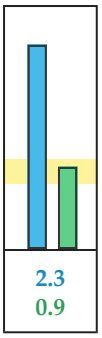
Zn/Cu
- 35 %



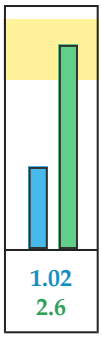
Na/Mg
+ 481 %



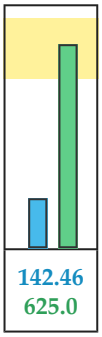
Ca/Mg
+ 237 %



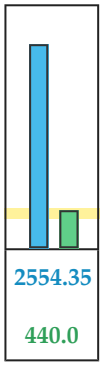
Fe/Cu
+ 156 %



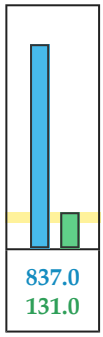
Ca/Na
- 61 %



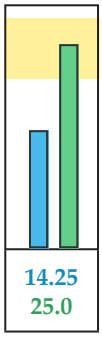
Cu/Mo
- 77 %



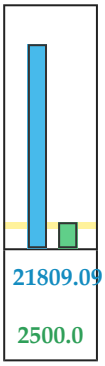
Fe/Co
+ 481 %



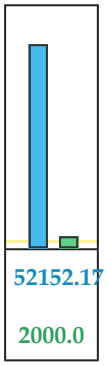
Ca/Sr
+ 539 %



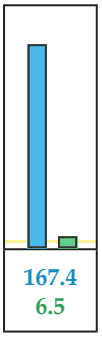
Ca/Fe
- 43 %



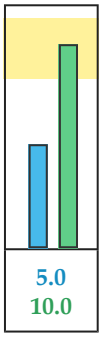
K/Li
+ 772 %



K/Co
+ 2508 %

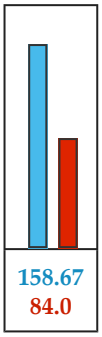


Ca/Si
+ 2475 %

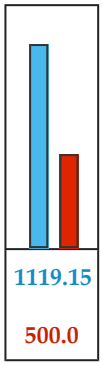


I/Se
- 50 %

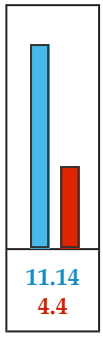
Toxic Proportions



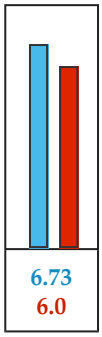
Ca/Pb
Correct



Zn/Cd
Correct



Fe/Pb
Correct



Mg/Pb
Correct

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: 2017-11-21. Test date: 2017-12-04. Authorisation date: 2017-12-07.

We hereby represent that the result is based on the sample which we received on 2017-11-21.

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.

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

Na/K Low relation of sodium to potassium indicates increased catabolic activity, connected to increased secretion of glucocorticoids. Increased content of glucocorticoids in the organism affects, among others, the metabolism of proteins (catabolism - decomposition), and inhibits cellular immunity (immunosuppressive activity). At prolonged activity of stressing factor (continuous stress), increased activity of adrenal glands may follow. Increased secretion of glucocorticoids may lead to a number of disturbances such as depression, proteins metabolism abnormalities, or disturbances of immunological type.

Ca/K Thyroid exerts essential influence on the metabolism of calcium and potassium. If the proportion of calcium to potassium is abnormal (low value), it can indicate increased activity of the thyroid (this does not necessarily mean hyperthyroidism) - in case of confirmed significant disorders of the thyroid, contact your doctor to carry out additional investigations

Na/Mg The amount of sodium and magnesium is related with blood pressure. High content of sodium in the body, at high Na/Mg proportion, suggests increased production of aldosterone and may lead to high blood pressure. Small amount of sodium in the body, at low Na/Mg proportion, suggests decreased production of aldosterone. This may be the reason of low blood pressure. Your result of analysis indicates a tendency to elevated blood pressure.

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/Cu The proportion of Fe/Cu is inappropriate, due to a large content of iron (Fe/Cu = 2:1). This may suggest formation of excessive amount of free radicals in the organism. Your result of analysis indicates increased production of free radicals and weakening of the antioxidative barrier.

Cu/Mo Physiological activity of molybdenum depends on its interaction with other elements. In particularly, proper Cu/Mo proportion is important . As copper and molybdenum are antagonistic elements, excess of molybdenum can cause secondary deficit of copper. Low value of proportion of copper to molybdenum, even at high concentration of copper, can suggest disturbances of the processes of copper absorption.

Ca/Fe Abnormal proportion of calcium to iron, at high quantity of iron, can suggest disturbances in the metabolism of iron. Main place where iron accumulates is the liver and reticuloendothelial system. At low concentration of calcium (low Ca/Fe proportion) iron accumulates in the liver and may affect its functions. Depending on other disturbances of mineral metabolism various symptoms may develop, such as: hypertension, headaches, excessive anger, aggression, increased concentration of triglycerides and cholesterol in the blood.

5. Metabolic type (biological nature) characteristics

Reference names: dominant features are underlined.

Energetics

slow **quick**

Sympathetic/parasympathetic

sympathetic parasympathetic

Digestion

slow **quick**

Free-radical Ageing

slow **quick**

Metabolic Equilibrium

catabolism anabolism

Reaction To Stress

good **bad**

Endocrine Function

Adrenal Cortex - Efficiency

good poor

Thyroid - Efficiency

good poor

Acid-base Equilibrium

Acidification With Uric Acid

yes **no**

Acidification With Lactic Acid

yes no

Quick type A / Sympathetic / metabolism characteristic of the thyroid type

5.1. Systemic energetics

Phosphorus is indispensable in all cellular processes of energy generation. The calcium to phosphorus proportion indicates accumulation of phosphorus or calcium in the cells and demonstrates which type of energy turnover predominates in the organism. Phosphorus is the basic component of high-energy compounds (energy carriers). Calcium is involved in intra- and extracellular communication (transport of nutrients through biological membranes). It takes part in the transmission of stimuli to the nervous system. The calcium to phosphorus ratio determines the rate of systemic energy turnover processes.

Fast metabolism

The result indicates predominance of quick energy turnover processes, so-called quick metabolism.

5.2. Assessment of equilibrium in the autonomic nervous system; sympathetic-parasympathetic equilibrium

Within the nervous system, the central nervous system (CNS), peripheral nervous system (PNS) and vegetative, or autonomic nervous system (ANS) can be distinguished. The CNS includes the brain and the spinal cord. The PNS is composed of the cranial nerves and their ganglia, spinal nerves and their ganglia, as well as receptors receiving stimuli. The ANS consists of two systems: the function of one (so-called sympathetic) is opposed by the other (so-called parasympathetic). ANS is a part of the nervous system responsible for involuntary actions. It regulates the functions of the internal organs. Depending on the situation, either the sympathetic or the parasympathetic system dominates in each subject. This equilibrium is determined by the mode of energy utilizatiion in the organism, e.g.: when we are eating a meal, we become parasympathetics (we accumulate energy); when we are running, we are sympathetics (we utilize energy).

Domination of the sympathetic nervous system

Stimulation of the sympathetic system activates catabolic processes. It results in faster heart rate, narrowing of blood vessels, increasing blood pressure, sphincter loosening, decreased production of gastric acid, intestinal juice, urine and sweat, dilation of bronchi, stalled intestinal peristalsis, pupil dilation.

Such a person could be described as energetic, but not for long, with a tendency for enthusiastic and quick activity, an individual who makes decisions easily, does not spend a lot of time relaxing, and is in a good mood for most of the day. To ensure health for a long time, this type of a person needs to be balanced by the parasympathetic part of the autonomic nervous system through increased intake of magnesium and potassium. Thanks to this, calcium and phosphorus are retained in the organism, which leads to better parasympathetic activity. Regular, rather intensive physical effort is recommended (the body should "sweat well") as the best method of relaxation.

5.3. Digestion

Fast digestion

The mineral turnover profile indicates quick absorption and utilization of nutrients. This may lead to acceleration of the metabolic rate. The organism may have problems with long-term maintenance of appropriate energetic equilibrium. The subjects representing this metabolic type tend to eat and snack frequently.

5.4. Endocrine functions

The mineral turnover profile indicates increased activity of the adrenal glands and thyroid (not to be confused with hyperactivity of the aforementioned endocrine glands). The internal systemic stability (homeostasis) is directly dependent on the following systems: cardiovascular, respiratory, digestive, thermoregulation and endocrine glands. A patient with long-term predominance of quick generation of energy may demonstrate (but not necessarily – the lifestyle, medications, supplements, diet, may eliminate the following symptoms):

- elevated body temperature,
- irritability,
- high blood pressure,
- excessive sweat secretion,
- body weight gain in waist and shoulder region.

5.5. How quickly is your organism ageing?

The human organism is ageing from the moment of birth. A few ways of ageing have been described. Free radical reactions have the most significant influence on the course of ageing processes. The largest group among free radicals are reactive oxygen species (ROS).
If free radicals are generated on a limited scale, they play a positive role for the organism. If this scale is large and the process lasts for a long time, it may cause significant damage, leading to civilization diseases.
Free radical theory of ageing is based on the efficiency of respiratory chain reactions. This efficiency is becoming lower and lower with age, particularly with respect to people above 50 years of age.
At each site where free radicals can be generated, the organism has developed defense mechanisms, which are so distributed to act in a way complementary to one another. Enzymatic defense, the efficacy of which is provided by zinc, copper and manganese, is the most important. If the enzymatic barrier is too weak, the defensive role is taken over by selenium, antioxidative vitamins: E, A and C, bioflavonoids, biothiols and other antioxidants of plant origin. There are close correlations between the ageing processes, nutritional patterns and efficiency of the antioxidative barrier. On that basis, the scale of damages caused by free radicals and the ageing rate of the organism can be determined.

Fast free-radical ageing

Considerable impairment of the antioxidative barrier is possible, with increased production of free radicals and acceleration of the aging processes. High risk of civilization-related diseases due to damages caused by free radicals

5.6. Psycho-emotional equilibrium assessment - reaction to stress

In medicine stress is a condition manifesting itself with a number of nonspecific changes induced in the whole biological system, human or animal, by a stressor. Mental stressors include e.g.: situational stimuli, conflicts and frustrations. Any factor (e.g. biological, chemical, thermal, exertion or lack of physical activity, tiredness, changes of weather, toxic factors, emotions, physical contact with the environment, diseases), triggering more or less pronounced nonspecific changes can be a stressor. Stressors lead to disturbances of the systemic homeostasis. If the stressor is very strong (or long-lasting), it leads to exhaustion of the adaptation potential. It is associated with increased risk of many pathologies, e.g. cardiovascular diseases, rheumatic disease, dyspepsia, metabolic disorders, or allergic reactions. The main regulators of stress syndrome are: the brain, nerves, the pituitary, the thyroid, adrenals, liver, kidneys, blood vessels, connective tissue, white blood cells. The complex of systemic changes triggered by stressors is referred to as systemic adaptation syndrome. It develops through three stages (phases):

- The alarm phase - stimulation of the adrenal cortex to secrete glucocorticoids.
- The adaptation phase - systemic changes allowing to ensure coping with (survival of) stress.
- The exhaustion phase - if exposure to stressors is too long, a pathology develops.

Stress does not have to be harmful(stress/distress). The human life is associated with functioning under continuos stress. It is inevitable and even necessary for life. Some kinds of stress can be motivating and positive. Distress is destructive for the organism. If it is prolonged, it may lead to health deterioration.

The aim of the recommended diet is to prepare the organism for an adequate response to stress, according to the stressor involved and the hazard level. Appropriate response makes it possible to reduce the level of stress (de-stressing - relaxation).

In Your organism, the quick mineral turnover profile indicates a tendency towards high metabolic rate. Such condition may lead to manifestation of all stress phases, i.e.: alarm phase, adaptation phase, exhaustion phase. A patient with quick energy generation predominance has a high demand for antioxidants.

The result indicates systemic abnormalities due to stressors.
Your organism coopes with stress poorly.

5.7. Metabolic equilibrium assessment - catabolism/anabolism

Metabolism comprises the overall spectrum of chemical reactions and energetic processes taking place in the cells. Metabolic processes make it possible for the cells to grow and proliferate, manage their internal structure and respond to external stimuli. The metabolic pathways can be divided into two types: anabolism, i.e. „building" and catabolism, i.e. „burning". In adolescence, anabolism should be predominant, and in adult subjects it should be balanced with catabolic processes. In the case of domination of anabolism in an adult, the processes of fat accumulation in adipose tissue can be enhanced, which leads to overweight. Significant predominance of catabolic processes evidences the potential for generation of excess energy, which may be associated with increased production of free radicals and high risk of civilization diseases.

Mineral turnover, illustrated by proportions between bioelements, indicates the effect of hormonal activity (without indicating the amount of hormones) in the specific organs, i.e. is a reflection of neuroendocrine functions.

Slight changes in hormonal activity over a short period of time do not affect the equilibrium of mineral turnover. Long-term changes in hormonal functions significantly disturb homeostasis, which results in permanent changes of mineral turnover. Elemental analysis of hair makes it possible to detect this phenomenon.

Increased activity of catabolic processes

The result indicates increased activity of catabolic processes.

Selection of appropriate diet for a particular person is dependent on metabolic equilibrium of the organism. If the processes of decomposition of organic compounds (catabolism) outweigh the processes of their synthesis (anabolism) mainly fatty acids are processed in the liver. In many cases, such condition may lead to acceleration of metabolic processes.

5.8. Assessment of acid-base equilibrium efficiency

Acidification of the organism is most frequently caused by excessive production of lactic acid. It is produced as a result of various factors, including, among others, deficiency of minerals and vitamins indispensable to generate energy in the cells, or during emotional and psychological disorders. Such condition may develop if too much energy is generated by glycolysis with hypoxia and weak musculo-hepatic cycle. The respiration at the cellular level is impaired, leading to an energetic deficit.

Acidification of the organism will be reflected in particular in impairment of the immune function. Additionally, mineral and/or vitamin deficiency may cause a dysfunction of cellular respiration in various tissues, which may be manifested by continuous tiredness. Elevated concentration of lactic acid causes intracellular acidification. To counteract the excess acidity, calcium, as a neutralizing factor, begins to deposit in the tissues. The blood is well-buffered to maintain the Ca level of 9-11 mg%. When Ca concentration falls below 9 mg%, the parathyroids activate the production of PTH, which causes transfer of Ca from the bones and teeth to soft tissues and mitochondria.

Such energy deficit may lead to distant consequences in the activity of anabolic and catabolic processes. If the condition is prolonged, it causes hyperparathyroidism, involving transport of increasing amounts of calcium and magnesium to the cells. Excessive activity of the parathyroids will be visible in the elemental analysis as increased content of calcium and magnesium in the hair.

The second type of acidosis is due to consumption of proteins of animal origin with high content of purines, which are catabolized to uric acid. With decelerated detoxification by the urea cycle, the organism is acidified by excess uric acid. To neutralize acidification, Ca and Mg transport to the tissues is increased. The effect visible in elemental analysis will be increased levels of Ca, Mg and P. The consequence of such condition will be increased bone calcium loss, which leads to osteoporosis, dental caries and calcification of soft tissues. Increased mitochondrial Ca and Mg levels will impair intracellular respiration and energy production rate. Correction of vitamin and mineral deficiency is necessary, as well as improvement of systemic detoxification mechanisms and change of the diet.

The result indicates acidification of the organism due to excessive amount of lactic acid.

The diet consumed so far has had too high carbohydrate content, especially saccharides (sucrose). This type of acidification often indicates problems with appropriate reaction to stress as well.

5.9. Health-related tendencies

- **This profile suggests increased risk of the development of osteoporosis 2 [high Ca/Mg proportion, low concentration of copper].**
- **This profile suggests possibility of humoral immunity disorders.**
- **This profile suggests susceptibility to development of alimentary and respiratory allergy, which may be due to low concentration of zinc or low Zn/Cu proportion and high concentration of copper.**
- **This profile suggests possibility of cellular immunity disorders.**
- **This profile suggests possibility of hypersensitivity of the central nervous system to, for example, noise, anxiety, and difficulties in falling to sleep.**
- **This profile suggests vegetative system disorders, mainly manifesting as functional predominance of the sympathetic part of the vegetative system, and possibility of the development of neurasthenic syndrome.**
- **This profile suggests possibility of disturbances in absorption form the alimentary tract.**
- **This profile suggests susceptibility to liver disorders.**
- **This profile suggests weakness of the efficiency of antioxidative barrier.**
- **This profile suggests susceptibility to neuro- muscular disorders.**
- **This profile suggests susceptibility to pancreas and spleen disorders, which may be connected with changing concentration of glucose in the blood and decreased production of pancreatic enzymes, and may lead to disturbances of proteins and fats absorption.**
- **This profile suggests increased risk of arteriosclerosis.**
- **This profile suggests susceptibility to collagen synthesis disorders, which can lead to increased risk of development of osteo-articular system disorders.**
- **This profile suggests increased risk of the development of osteoporosis 1**
- **This profile suggests possibility of neurovegetative system disturbances.**

6. 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 reparation of meals.

Part One - Nutrition scheme

Supplement	morning	afternoon	evening
Lactobacillus acidophilus every day, for one month	1 before meal	0	0
Acerola 30 mg every day, for one month	2 before meal	2 before meal	0
B-complex every day, for one month	0	0.5 after meal	0
Calcium 200mg Magnesium 83mg Vit. D3 3,3mc every day, for one month	0	0.5 after meal	0.5 after meal
Magnesium in sachets - 250 mg every day, for one month	0.5 after meal	0	0
Selenium 50 mcg every day, for one month	0.5 after meal	0	0
Chromium 50 mcg every day, for one month	0	0.5 after meal	0
Zinc in sachets - 10 mg every day, for one month	0	0	0.5 after meal
Omega-3 (EPA 180 mg, DHA 120 mg) every day, for one month	0	2 30 minutes before meal	1 30 minutes before meal
Antioxidant Complex every day, for one month	1 after meal	0	0
Lecithin 300 mg every day, for one month	0	0	1 after meal
GREEN TEA every two days, for one month	1 after meal	0	1 after meal

Part Two - Preventive scheme

Supplement	morning	afternoon	evening
Lactobacillus acidophilus every three days, for six months	1 before meal	0	0
Acerola 30 mg every day, for six months	2 before meal	2 before meal	0
Calcium 200mg Magnesium 83mg Vit. D3 3,3mc every day, for six months	0.5 after meal	0	0.5 after meal
Multivitamin for children every day, for six months	0	1 With lunch	0
B-complex every three days, for six months	0.5 after meal	0	0
Omega-3 (EPA 180 mg, DHA 120 mg) every day, for six months	0	1 30 minutes before meal	1 30 minutes before meal
Antioxidant Complex every two days, for six months	1 after meal	0	0
Lecithin 300 mg every two days, for six months	0	1 after meal	0
GREEN TEA every two days, for six months	0	0	1 after meal

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.

Test result authorised by:

7. The physical growth of the child

Growth chart is a tool for objective assessment of physical development of children.

Physical development of a child is an individual process. It is dependent on the parents' genetics and environmental conditions (general living standard, nutrition, diseases suffered etc.). Children differing significantly from their peers, are generally within the norm, which is quite extensive in the growth chart. Growth charts are grids with percentiles assigned to a specific weight and height of children between 1 and 18 years of age.
Height and weight percentiles are statistical values determining the child examined in relation to children with the same weight or height. After the age, gender, weight and height of a child is given, a point is marked in the growth chart. It is the percentile which applies to the child and specifies the percentage of children below and above that point. For example, percentile 65 means that the child is heavier than 65% children of the same age and gender, and lighter than 35% children of that gender and age.

The parameters of physical growth of the child are within the correct range of the growth chart.

8. Metabolic diet

Basic ingredients of the diet (in the order of importance):

- **cooked vegetables,**
- **white meat (chicken, turkey),**
- **gluten-free bread,**
- **lettuce leaf**
- **gluten-free groats (buckwheat, millet, maize, quinoa seed),**
- **gluten-free noodles and pasta,**
- **rice,**
- **nuts and seeds,**
- **milk casein-free (e.g. made of soya, rice)**
- **eggs**

The amount of kilocalories consumed should be adjusted to the subject's daily demand in the following way::

- the recommended daily amounts of kilocalories are specified above
- depending on physical activity, an appropriate option should be chosen
- check the total daily intake of kilocalories resulting from the recommended diet
- if the calorific value of the diet is too high, the size of meals should be reduced, until an appropriate value is obtained, according to the following algorithm: reduce the supper by o 1/4 or by 1/2; if the amount of kilocalories is still too high, reduce additionally the lunch/dinner by 1/4 or by 1/2
- if the calorific value of the diet is too low, the size of meals should be increased, until an appropriate value is obtained, according to the following algorithm: increase the supper by o 1/4 or by 1/2; if the amount of kilocalories is still too low, increase additionally the lunch/dinner by 1/4 or by 1/2

Note

In the exemplary diet for subjects below 18 years of age alcohol beverages and coffee (if applicable) should be excluded from the recipes.

8.1. Diet for 7 days

Day 1 (all meals) - 1606 kcal			
Breakfast	**Breakfast II**	**Dinner**	**Supper**
Lean ham - slices 1 Serving - 84 kcal Gluten free bread 1 Serving - 16 kcal Wild rose hip tea 1 Serving - 0 kcal Lettuce leaf 1 Serving - 1 kcal	Coconut pudding 1 Serving - 144 kcal	Vegetable soup with barley 1 Serving - 335 kcal Dumplings with vegetables 1 Serving - 320 kcal Broccolis 1 Serving - 81 kcal	Cabbage leaves stuffed with millet 1 Serving - 625 kcal melissa tea (from melissa`s leaves) 1 Serving - 0 kcal
Total: 101 kcal	**Total: 144 kcal**	**Total: 736 kcal**	**Total: 625 kcal**

Day 2 (all meals) - 1222 kcal			
Breakfast	**Breakfast II**	**Dinner**	**Supper**
Millet spread 1 Serving - 359 kcal corn bread 1 Serving - 121 kcal Lettuce leaf 1 Serving - 1 kcal Wild rose hip tea 1 Serving - 0 kcal	Coconut pudding 1 Serving - 144 kcal	Beetroot cream soup 1 Serving - 62 kcal Grilled turkey breast 1 Serving - 100 kcal Buckwheat 1 Serving - 336 kcal Cooked carrots 1 Serving - 27 kcal	Brussels sprouts with butter 1 Serving - 56 kcal Wild rose hip tea 1 Serving - 0 kcal Gluten free bread 1 Serving - 16 kcal
Total: 481 kcal	**Total: 144 kcal**	**Total: 525 kcal**	**Total: 72 kcal**

Day 3 (all meals) - 1560 kcal			
Breakfast	**Breakfast II**	**Dinner**	**Supper**
Two steamed scrambled eggs with chives 1 Serving - 204 kcal Gluten free bread 1 Serving - 16 kcal Lettuce leaf 1 Serving - 1 kcal Wild rose hip tea 1 Serving - 0 kcal	Rhubarb starch jelly 1 Serving - 108 kcal	Carrot and celery soup 1 Serving - 117 kcal Chicken meatballs 1 Serving - 223 kcal Buckwheat groats, small serving 1 Serving - 168 kcal Steamed cauliflower 1 Serving - 22 kcal	Buckwheat risotto 1 Serving - 701 kcal melissa tea (from melissa`s leaves) 1 Serving - 0 kcal
Total: 221 kcal	**Total: 108 kcal**	**Total: 530 kcal**	**Total: 701 kcal**

Day 4 (all meals) - 1280 kcal			
Breakfast	**Breakfast II**	**Dinner**	**Supper**
Gluten free bread 1 Serving - 16 kcal Boiled egg 1 Serving - 65 kcal Lettuce leaf 1 Serving - 1 kcal Wild rose hip tea 1 Serving - 0 kcal	Coconut pudding 1 Serving - 144 kcal	Potato cream soup 1 Serving - 288 kcal Rice with cauliflower 1 Serving - 321 kcal Broccolis 1 Serving - 81 kcal	Pumpkin and asparagus risotto 1 Serving - 364 kcal Wild rose hip tea 1 Serving - 0 kcal
Total: 82 kcal	**Total: 144 kcal**	**Total: 690 kcal**	**Total: 364 kcal**

Day 5 (all meals) - 1586 kcal			
Breakfast	**Breakfast II**	**Dinner**	**Supper**
Zucchini pancakes 1 Serving - 101 kcal Camomile tea 1 Serving - 0 kcal Lettuce leaf 1 Serving - 1 kcal	Groats and chicken mousse 1 Serving - 115 kcal	Delicate dill soup 1 Serving - 278 kcal Roasted chicken thigh 1 Serving - 395 kcal Brown rice 1 Serving - 161 kcal Brussels sprouts with butter 1 Serving - 56 kcal	Mchadi cornbreads 1 Serving - 421 kcal Boiled vegetables with flax-seed 1 Serving - 58 kcal melissa tea (from melissa`s leaves) 1 Serving - 0 kcal
Total: 102 kcal	**Total: 115 kcal**	**Total: 890 kcal**	**Total: 479 kcal**

Day 6 (all meals) - 1624 kcal			
Breakfast	**Breakfast II**	**Dinner**	**Supper**
Vegetable jelly 1 Serving - 255 kcal Gluten free bread 1 Serving - 16 kcal Wild rose hip tea 1 Serving - 0 kcal Lettuce leaf 1 Serving - 1 kcal	Rice flakes 1 Serving - 344 kcal	Pumpkin cream-soup 1 Serving - 233 kcal Vegetable ragout 1 Serving - 330 kcal	Potato dumplings 1 Serving - 445 kcal Wild rose hip tea 1 Serving - 0 kcal
Total: 272 kcal	**Total: 344 kcal**	**Total: 563 kcal**	**Total: 445 kcal**

Day 7 (all meals) - 1245 kcal			
Breakfast	**Breakfast II**	**Dinner**	**Supper**

Chicken jelly with vegetables 1 Serving - 255 kcal Gluten free bread 1 Serving - 16 kcal Camomile tea 1 Serving - 0 kcal Lettuce leaf 1 Serving - 1 kcal	Soft-boiled eggs 1 Serving - 20 kcal corn bread 1 Serving - 121 kcal	Vegetable soup with barley 1 Serving - 335 kcal Boiled duck breast 1 Serving - 35 kcal Steamed potatoes 1 Serving - 77 kcal Broccolis 1 Serving - 81 kcal	Zucchuni fettucine 1 Serving - 304 kcal Wild rose hip tea 1 Serving - 0 kcal
Total: 272 kcal	**Total: 141 kcal**	**Total: 528 kcal**	**Total: 304 kcal**

8.2. Recipes from Your diet

Steamed cauliflower (22 kcal)
Ingredients
Cauliflower - 100 g
Preparation
• Wash the cauliflower, divide it into pieces and steam them (boil for about 5-10 minutes).

Beetroot cream soup (249 kcal)
Ingredients
Beetroot - 500 g, Carrots - 90 g, Parsley, roots - 60 g, Water - 1000 g, Garlic - 5 g, Lemon juice - 5 g, Vinegar - 5 g, Ground black pepper - 1 g, Bay leaves - 1 g, White salt - 1 g, Dill - 10 g
Preparation
• Peel and chop the vegetables, then boil them in some water. • Add the crushed garlic and spices and herbs. • Cook for 20 minutes, take out the laurel leaves and blend the soup. Serve sprinkled with finely chopped dill.

Boiled duck breast (140 kcal)
Ingredients
duck breast meat - 100 g, White salt - 3 g
Preparation
• Boil the duck breast in slightly salted water and cook it until it is soft.

Boiled egg (65 kcal)
Ingredients
Boiled eggs - 60 g
Preparation
• Boil the egg for about 10 minutes.

Boiled vegetables with flax-seed (58 kcal)
Ingredients
Linseed - 10 g, Broccoli - 30 g
Preparation
• Boil any of your favourite vegetables (e.g. carrots, cauliflower, broccoli), add the flax-seed and mix all the ingredients.

Brown rice (322 kcal)
Ingredients
Brown rice - 100 g, Water - 200 g, White salt - 1 g
Preparation
• Pour 200 ml of water into a pot, salt and bring it to a boil. • When the water is cooking, put in the rice.

- Cook over low heat until soft.

Brussels sprouts with butter (56 kcal)

Ingredients

Brussels sprouts - 150 g

Preparation

- Steam the Brussels sprouts until soft.

Buckwheat (336 kcal)

Ingredients

Buckwheat groats - 100 g, White salt - 2 g

Preparation

- Boil the buckwheat in slightly salted water.

Buckwheat groats, small serving (168 kcal)

Ingredients

Buckwheat groats - 50 g, White salt - 1 g

Preparation

- Boil the buckwheat groats in slightly salted water.

Buckwheat risotto (2105 kcal)

Ingredients

Buckwheat groats - 500 g, Water - 1000 g, Onions - 100 g, Garlic - 14 g, Rapeseed oil - 30 g, Green peas - 100 g, Carrots - 100 g, Parsley, leaves - 20 g, White salt - 1 g

Preparation

- Finely chop the onion, garlic and carrots.
- Stew the garlic, carrots and peas in oil, add the buckwheat and fry for a moment.
- Pour salted boiling water into the dish.
- Cook (with a lid on) on a low fire for about 15-20 minutes, stir from time to time.
- Serve sprinkled with parsley.

Cabbage leaves stuffed with millet (2500 kcal)

Ingredients

Millet groats - 500 g, White cabbage - 1500 g, Onions - 100 g, Rapeseed oil - 20 g, Ground black pepper - 3 g, White salt - 3 g, Parsley, leaves - 20 g, Vegetable stock - 1000 g

Preparation

- Cut out the cabbage stalk. Scald the cabbage and separate the leaves.
- Cook the millet but do not let it become completely tender.
- Peel the onion, chop it, and fry it until it becomes transparent. Mix the millet and the onion, season the mixture with salt and pepper, and add chopped parsley.
- Put portions of millet on cabbage leaves and roll them. Put the stuffed leaves in a pot tightly. Pour a broth over them and stew them over a low flame for app. 20-25 minutes.

Carrot and celery soup (234 kcal)

Ingredients

Onions - 160 g, Celery - 50 g, Carrots - 500 g, Water - 700 g, Nutmeg - 5 g, White salt - 3 g, Ground black pepper - 3 g, Olive oil - 5 g

Preparation

- Peel and chop the onion, wash and chop the celery stalks, peel and grate the carrot.
- Stir-fry the onion on the skillet in olive oil.
- Pour water into a pot and add the carrot, onion, vegetable stock and cook over low heat for 20 minutes.
- Grind the nutmeg and season the soup, add the chopped celery leaves and mix.
- Season with salt and pepper. Serve hot.

Chicken jelly with vegetables (1022 kcal)

Ingredients

Chicken breast, without skin - 500 g, Meat stock - 1500 g, Soup vegatables - 500 g, Onions - 100 g, Bay leaves - 3 g, White salt - 3 g, Ground peppers - 3 g, Black pepper – grains - 3 g, Gelatin - 20 g, Whole chicken eggs - 120 g, Green peas, potted, without brine - 50 g, Chicken egg whites - 60 g

Preparation

- Pour the stock onto the meat and boil it with the peeled vegetables, a laurel bay leaf and a few grains of black pepper.
- At the end of cooking, add a pinch of chilli.
- Drain through a sieve to another pot.
- Cut the meat into pieces and slice the vegetables.
- Remove fat from the stock, heat it and clarify it, i.e. add the slightly whisked egg whites and boil, stirring all the time.
- Drain one more time and take one litre of the stock.
- Melt the gelatine in the hot stock and put aside until it starts to solidify.
- Put the meat and vegetable pieces into the bowls and pour a part of the jelly on them.
- Put the bowls into the fridge and when the first layer solidifies, decorate it with slices of hard-boiled egg peas.
- Pour the remaining part of the jelly into the bowls and put them into the fridge again (overnight, if possible). Take the jelly out of the bowls when it is firm.

Chicken meatballs (893 kcal)

Ingredients

Turkey legs, with skin - 250 g, Turkey breast, with skin - 250 g, White salt - 2 g, Marjoram - 1 g, Thyme - 1 g, Oregano - 1 g, Whole chicken eggs - 55 g, Ground black pepper - 1 g, Meat bouillon - 500 g, Linseed - 40 g

Preparation

- Mince the meat, put in a blow, add salt, herbs, pepper, break an egg, add linseeds. Work the mix carefully.
- Boil broth in a pot.
- Form small balls of the meat and drop to the broth. Cook for about 10 minutes.

Coconut pudding (578 kcal)

Ingredients

soya milk - 500 g, Coconut oil - 10 g, Dessicated coconut - 15 g, Corn flour - 15 g, Potato starch - 15 g

Preparation

- Roast desiccated coconut in a dry frying pan.
- Mix flour with milk in a pot, add coconut oil and the roasted desiccated coconut.

- Boil and cook for about 3 minutes, stir all the time, until the pudding becomes smooth.

Cooked carrots (27 kcal)

Ingredients

Carrots - 100 g, Water - 250 g, White salt - 2 g

Preparation

- Wash, peel and dice the carrots.
- Pour water into the pot, add a pinch of salt, boil.
- Add the carrots.
- Cook on a low fire until soft.

Delicate dill soup (834 kcal)

Ingredients

Dill - 60 g, Ground black pepper - 2 g, White rice - 100 g, Chicken leg - 250 g, Carrots - 150 g, Parsley, roots - 100 g, Allspice - 1 g, Bay leaves - 1 g

Preparation

- Cook a kitchen leg with carrot and parsley roots, allspice, pepper and laurel leaves in about 1,5 litres of water. After about 50 minutes, take out the meat, carrot and parsley.
- Rinse rice and add it to the stock, boil and cook for about 10 minutes. Finely chop the carrot and parsley roots and add them to the soup.
- Rinse and chop dill and add it to the soup. Cook the soup for a few minutes, until the rice is soft.
- If the rice absorbs too much liquid, add some boiled water.

Dumplings with vegetables (1282 kcal)

Ingredients

Potatoes, medium - 450 g, Whole chicken eggs - 60 g, Ground rice - 150 g, White salt - 3 g, Ground black pepper - 4 g, Carrots - 300 g, Parsley, roots - 150 g, Parsley, leaves - 20 g, Onions - 100 g, Rapeseed oil - 10 g, Champignons, fresh - 60 g, Red peppers - 200 g

Preparation

- Boil the potatoes in their jackets. Peel and mince them when cooled. Add the flour, egg and knead them until the pastry is soft.
- Clean and coarsely grate the champignons, carrot, and parsley, cut the pepper into slivers and chop the onion.
- Stew all the vegetables in oil, add some salt and pepper, then add chopped parsley.
- Form small pancakes, add a bit of filling and then close them, forming round dumplings. Next, put them into boling salty water and cook, making sure the water does not boil, for about 10-15 minutes. Drain them afterwards.

Grilled turkey breast (100 kcal)

Ingredients

Turkey breast, with skin - 100 g

Preparation

- Clean and dry the turkey breast.
- Grill until ready.

Groats and chicken mousse (462 kcal)

Ingredients

Buckwheat groats - 100 g, Chicken breast, without skin - 100 g, Carrots - 100 g

Preparation

- Boil all the ingredients, drain them and blend.

Mchadi cornbreads (1685 kcal)

Ingredients

Corn flour - 500 g, Water - 500 g, White salt - 2 g

Preparation

- Sieve the corn flour, add warm water to it (~50°C) and stir energetically until the ingredients become smooth batter.
- Form small breads/pies on the baking pan and bake them in a pre-heated oven until the skin becomes golden brown. Then flip the breads and bake for a while more.

Millet spread (719 kcal)

Ingredients

Millet groats - 200 g, Carrots - 100 g, Basil - 10 g, White salt - 3 g, Water - 200 g

Preparation

- Boil the millet in slightly salted water and cool it down. Boil the carrots until soft.
- Blend all the ingredients into smooth spread and serve it with bread.

Potato cream soup (1154 kcal)

Ingredients

Carrots - 80 g, Leek - 80 g, Celeriac - 70 g, Garlic - 5 g, White salt - 2 g, Ground black pepper - 2 g, Rosemary - 3 g, Bay leaves - 1 g, Allspice - 2 g, Pork, ribs - 100 g, Potatoes, medium - 1000 g

Preparation

- Boil and cook vegetables, rib, spices and herbs. When all the vegetables are soft, take the meat out of the stock.
- Boil potatoes separately, then sprinkle them with some olive oil and fresh rosemary leaves and bake them in an oven.
- Add the potatoes to the stock and blend the soup.

Potato dumplings (1780 kcal)

Ingredients

Potatoes, medium - 1600 g, Ground rice - 80 g, Potato starch - 80 g, White salt - 3 g

Preparation

- Boil the potatoes in their jackets and cool them down (potatoes boiled on the previous day are the best). Peel and mince them.
- Peel and grate the raw potatoes. Drain them thoroughly.
- Put the minced boiled potatoes, grated and drained raw potatoes and rice flour into a large bowl. Work it so that all the ingredients are mixed.
- Start forming dumplings with wet hands.
- Boil salted water in a pot. Delicately put the dumplings into the pot.
- After the dumplings start floating, boil them for 4 more minutes.

Pumpkin and asparagus risotto (1456 kcal)

Ingredients

Olive oil - 45 g, Onions - 60 g, White rice - 250 g, Pumpkin - 250 g, Thyme - 2 g, Asparagus - 150 g, Vegetable bouillon - 700 g, White salt - 1 g, Ground black pepper - 1 g

Preparation

- Fry the onion in hot olive oil until soft.
- Pour in the rice and roast for approximately 3 minutes.
- Pour in the wine and heat for a minute. Add the diced pumpkin and chopped thyme. Add a half of the stock and cook until the stock is absorbed in full.
- Pour in the rest of the stock in portions. When it is fully absorbed, add the chopped asparagus and cook for another 5 minutes.
- Take the dish off the heat and mix it with butter, then with parmesan. Season with salt and pepper.

Pumpkin cream-soup (932 kcal)

Ingredients

Pumpkin - 1000 g, Olive oil - 20 g, Carrots - 120 g, Onions - 120 g, Apple - 150 g, Nutmeg - 2 g, Ginger - 2 g, Cinnamon - 2 g, Vegetable bouillon - 1000 g, Ground rice - 15 g, Ground black pepper - 2 g, White salt - 2 g, Pumpkin, seeds - 30 g, Plant cream - 50 g

Preparation

- Dice the pumpkin, chop the onion, slice the carrots and cut the apple into large dices.
- Heat the oil in a large pot (use medium fire), add the onion, apple, carrot, pumpkin and the spices: nutmeg, ginger and cinnamon. Simmer under a lid for about 10 minutes, stir from time to time.
- Pour the stock into the pot and boil it.
- Keep on cooking until the pumpkin is soft (i.e. for about 15 minutes).
- Take the soup off the fire and blend it.
- Add some flour, stir and boil.
- Add some salt and pepper.
- Serve the soup with a spoonful of cream and a spoonful of roasted pumpkin seeds per serving.

Rhubarb starch jelly (217 kcal)

Ingredients

Potato starch - 50 g, Water - 600 g, Rhubarb - 500 g

Preparation

- Wash the rhubarb, dice it and put into a pot, cover with water and boil for 30 minutes.
- Mix ½ glass of cold water with the starch and energetically add it to the boiling fruit. Stir to remove any lumps. Boil for a few minutes.

Rice flakes (344 kcal)

Ingredients

Rice flakes - 100 g, Water - 300 g

Preparation

- Slowly add the rice flakes to boiling water and boil for 2 minutes, stir from time to time.

Rice with cauliflower (1286 kcal)

Ingredients

White rice - 150 g, Cauliflower - 500 g, linseed oil - 60 g, Garlic - 10 g, Ground black pepper - 2 g, Marjoram - 5 g, Soya sauce - 30 g

Preparation

- Boil the rice and the cauliflower.
- Heat the oil in a frying pan, add the chopped garlic clove, fry a little.
- Add the boiled rice and cauliflower. Fry for a moment, add some soya saouce and spices/herbs.

Roasted chicken thigh (395 kcal)

Ingredients

Chicken legs, with skin - 250 g

Preparation

- Clean and dry the meat.
- Bake in the oven until ready.

Soft-boiled eggs (83 kcal)

Ingredients

Whole chicken eggs - 60 g

Preparation

- Put the egg carefully into boiling water and cook it for about 3 minutes.

Steamed potatoes (77 kcal)

Ingredients

Potatoes, medium - 100 g

Preparation

- Steam the potatoes until soft (for about 30 minutes)..

Two steamed scrambled eggs with chives (204 kcal)

Ingredients

Whole chicken eggs - 120 g, Chive - 8 g, linseed oil - 4 g

Preparation

- Melt the butter in a pan, add the eggs.
- Fry over slow fire, stirring all the time.

Vegetable jelly (510 kcal)

Ingredients

Carrots - 80 g, Corn, potted - 200 g, Green peas, potted, without brine - 200 g, Dried tomatoes - 60 g, Parsley, leaves - 30 g, Gelatin - 40 g

Preparation

- Mix the gelatine with water, in accordance with the instruction on the packaging.
- Boil the carrots and slice them. Take other vegetables out of cans and drain them.
- Put a leaf of parsley, some carrot slices and a bit of other vegetables into small bowls.
- Pour the gelatine into the bowls and put them aside into a cool place until the jelly is solid.
- Put the bowls with solidified jelly into warm water for about 15 seconds, but make sure that the water does not touch the jelly. Carefully take the jelly out of the bowls.

Vegetable ragout (990 kcal)

Ingredients

Carrots - 300 g, Celeriac - 120 g, Savoy cabbage - 300 g, Potatoes, medium - 400 g, Onions - 300 g, Linseed - 3 g, Linseed oil - 40 g, Parsley, leaves - 10 g, White salt - 2 g, Ground black pepper - 2 g

Preparation

- Wash, peel and cut all the vegetables into quite large pieces. Set aside the whole onions.
- Fry the carrot and onions in a large saucepan in hot oil, add the remaining vegetables, pour water over them and salt.
- Cover the saucepan with the lid and cook over low heat for 40 minutes.
- Finally season with salt and pepper and mix with parsley.

Vegetable soup with barley (671 kcal)

Ingredients

Onions - 60 g, Carrots - 120 g, Celery - 100 g, White cabbage - 100 g, Potatoes, medium - 60 g, Vegetable stock - 1000 g, zucchini - 300 g, White salt - 1 g, Ground black pepper - 1 g, Basil - 2 g, Garlic - 2 g, Olive oil - 10 g, Millet groats - 80 g

Preparation

- Soak the barley for 2 hours in cold water, finely dice the onion, carrot, celeriac, potato, and courgette, shred the cabbage.
- Pour the barley into a pot, pour cold water over it, cook for approximately 25 minutes until soft. Strain.
- Put the onion, carrot, celeriac, cabbage and potato into another pot, pour the stock over them and bring to a boil.
- Add the courgette, salt and pepper and cook for approximately 15 minutes, stirring from time to time.
- Put the garlic, basil, 8 tablespoons of hot stock into the mixer and mix until smooth.
- Put the garlic pulp and barley into the pot with the vegetables. Mix and, if necessary, season and sprinkle with olive oil. Serve hot.

Zucchini pancakes (404 kcal)

Ingredients

zucchini - 500 g, Whole chicken eggs - 60 g, White salt - 3 g, Ground black pepper - 3 g, Rapeseed oil - 10 g, Buckwheat flour - 45 g

Preparation

- Sprinkle some salt on grated zucchini and put it aside for 20 minutes, for the juice to come out. After that, squeeze the juice off thoroughly.
- Mix the zucchini, egg, flour and pepper until the batter becomes smooth.
- Heat some oil in a frying pan, spoon the zucchini batter into it and fry for 3-4 minutes on each side, until the pancakes become golden-brown. Serve e.g. with garlic dip.

Zucchuni fettucine (914 kcal)

Ingredients

zucchini - 800 g, Tomatoes - 600 g, Pickled green olives, potted - 80 g, Garlic - 10 g, Olive oil - 30 g, White salt - 1 g, Ground black pepper - 1 g, Parsley, leaves - 10 g, Gluten-free pasta - 250 g

Preparation

- Wash, clean and slice the zucchinis.
- Wash the tomatoes and cut them into eights.
- Slice the olives.
- Finely chop the garlic and saute it in the frying pan.
- Add the zucchini and stew on a low fire for about 5-8 minutes.
- Pour water into the pot, salt it, boil, add pasta and cook it until soft.

- Add the tomatoes and olives to the zucchini and sprinkle with salt and pepper.
- Chop the parsley and add it to the vegetable sauce.
- Put the pasta onto plates, pour the sauce on it, and sprinkle it with grated parmesan.

Note! This report may be copied only as a whole.
The result has been issued in accordance with the PB-01 test procedure. from 01.02.2016
The result was verified by: dr n. med. Sławomir Puczkowski on: 2017-12-18.

9. 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.

Na - Sodium

Sodium is the moist important cation of the extracellular fluid. It is accompanied by anions, usually chloride and hydrochloride. Hydrochloride anion is necessary for the regulation of acid-base balance. One of essential functions of sodium d maintaining normal osmolar pressure in body fluids. This protects the body from excessive fluids loss. Sodium is also important in maintaining normal excitability of muscles and permeability of membranes. Sodium and potassium regulate the metabolism of electrolytes and determine acid-base balance in the body, and play a key role in the conductivity of stimuli in all nervous cells.

Occurrence: bread, halibut, cod, turbot, milk not skimmed, olives, salted sticks, lettuce, broccoli, sardines in oil, celery, radish, Emmental cheese, Gouda cheese, Edam cheese, ham.

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.

P - Phosphorus

Phosphorus is present in every cell in the body, but about 80% of phosphorus is stored in bones in compounds with calcium. Phosphorus plays an important role ion the storage and transport of energy in the form of phosphate esters. The proportion of calcium to phosphorus in the diet influences the absorption and elimination of both these elements. If one of them is present in excess, elimination of the other increases. Phosphorus is necessary not only for energetic processes, but also in the formation of teeth and bones, acid-base balance. It is a component of phospholipids, which are material for brain and nervous cells construction, takes part in the synthesis of nucleic acids – DNA (deoxyribonucleic acid) and RNA (ribonucleic acid).

Occurrence: veal, milk chocolate, noodles, evaporated milk, nutsseeds, wheat bran and germ, trout, tuna, sardines in oil, Emmental cheese, Gouda cheese, Edam cheese, cheese spread, leguminous, plants, liver, brain, pork, beef, whole grains, yolk, sausages.

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.

Mo - Molybdenum

Molybdenum is classifies as one of the essential microelements, although no evident results of its deficit in humans were demonstrated. The concentration of this element in serum is 6,0 +/-2,2 μmol. Molybdenum is a component of the following metaloenzymes: xanthic oxidase, aldehyde oxidase, sulphite oxidase and other metaloenzymes participating in the metabolism of proteins, lipids and purines. The highest concentration of molybdenum in human organism was recorded in the liver and kidneys, bones and teeth.

Occurrence: brewing yeast, cauliflower, seeds, nuts, seeds, wholegrain and soya products, brown rice, lentils, spinach, leguminous plants, beef liver, green peas.

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.

Sr - Strontium

The role of this element is has not been fully explained. Strontium probably plays a role in the development of bones, and prevents caries. It probably is involved in energetic processes of in cells. The content of strontium in the blood is 0,4 +/- 0,1 umol/l.

Ni - Nickel

The concentration of this element in the blood is 82 +/- 22 nmol/l. In humans about 18 % of nickel is contained in the skin. Comparatively high concentration of nickel was also seen in bone marrow, lymphatic nodes, testes, and also in sweat, which is the route of elimination of this microelement. The role of nickel in the organism has not been fully explained. It is thought to play a role in the transport of oxygen to tissues, in the synthesis of enzymatic proteins, in the metabolism of carbohydrates, lipids and proteins, and synthesis of hormones. Rich sources of nickel are chocolate, cereals, fish, pulse crops germs. Deficit of nickel can be caused by dietetic errors and stress.
Occurrence: chocolate, crabs, seeds, nuts, wholegrain products, sea fish, leguminous plants.

Mn - Manganese

Manganese takes part in various physiological processes, mainly as an activator of enzymes regulating the metabolism of glucose and other carbohydrates, lipids including cholesterol and proteins. Manganese itself is not a component of these enzymes. Its function is not specific and it can be replaced by other metals, particularly by magnesium. One of the metaloenzymes containing manganese, carboxylase, can function also in connection with other metals. Manganese is an essential component of bones and is necessary for normal functioning of the central nervous system. Total content of manganese in the body is 12-20 mg. Main organs where manganese is stored are kidneys and liver. Manganese is one of the antioxidants. Its presence is necessary for the metabolism of vitamin B_1 and vitamin E. It activates some enzymes in the process of energy production, synthesis of glycogen, synthesis of urea and in coagulation and regeneration of the connective tissue. Manganese enhances the activity of magnesium in bones. Manganese replaces magnesium from its connections in enzymatic systems, but contrary to calcium and phosphorus it does not block these enzymes, but activates them even more than magnesium ions. Manganese as a catalyst takes part in the digestion of lipids and cholesterol. Manganese determines, among others: sexual activity, the pigment in hair, the activity of many enzymes and vitamins, functioning of pancreas. It affects the bones and teeth, participates in active cellular respiration, maintains normal level of sugars in the blood and collagen in tissues, participates in the production of hormones. The concentration of manganese in human tissues, particularly in the bones, decreases with age. Its deficit leads to bones deformations, growth disturbances and impairs co-ordination of movements (e.g. ataxia in animals). Fertility disorders connected with manganese deficit are secondary to abnormal synthesis of cholesterol and related compounds necessary for the synthesis of sexual hormones and other steroids.
Occurrence: avocado, pea, tea, barley, corn, almonds, olives, hazelnuts, walnuts, peanuts, oat, parsley, wheat, rice, sunflower, spinach, whole grain, sunflower seeds, potatoes, yolk, rye.

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.

Li - Lithium

The concentration of lithium in the serum of healthy people reaches 10 μmol/l. Lithium salts are used in the treatment of affective disorders, especially in the prophylaxis of bi-phasic affective disease (and treatment of depression). During treatment the concentration of lithium in the blood should be maintained at therapeutic level 0,6 -1,5 mmol/l. Toxic concentration is over 2 mmol/l.

B - Boron

Boron is not classified as essential element for humans and animals. However, its positive effects on body functions make it necessary to determine its content in food and fodder. The physiological role of boron has not been fully explained. There are reports on its influence on the metabolism of calcium, phosphorus and fluorine. Boron is thought to increase the level of steroid hormones in humans, and thus affects the assimilation of calcium and prevents osteoporosis. Boron exerts positive effects in rheumatic diseases. Boron is easily absorbed both from the alimentary tract and respiratory system, followed by immediate increase of its concentration in kidneys, and also brain, liver and fatty tissue. Boron is not accumulated in the organism and it is quickly eliminated. It is present for the longest time in nervous cells. In liver kidneys and brain similar quantities of boron were seen.

V - Vanadium

The concentration of vanadium in the serum is 0,5+/-0,2mmol/l. The role of vanadium in human metabolism has not yet been established. Deficit of this element has been described in animals. The biological role of vanadium is connected with the metabolism of lipids, sugars and sodium-potassium and calcium– magnesium metabolism. Vanadium plays a key role in the processes of transformation of phosphates and production of erythrocytes.

S - Sulphur

Sulphur is a component of cysteine, cistine, methionine, taurin, glutathion, liponic acid, biotins, vitamin B1 and coenzyme A. Sulphuric acid synthesized in the body is used by the liver in the processes of detoxication of many metabolites and drugs (xenobiotics). SH groups participate in oxidation-reduction processes. Sulphur is a component of sulphatides and mukopolisaccharides. Twenty-four elimination of sulphur with urine, in the form of inorganic sulphides, esters of sulphuric acid and neutral sulphur (e.g. cysteine, cistine, taurin) is a marker of protein metabolism and can be used determine protein balance. Daily requirement of sulphur is closely connected with protein metabolism and vitamins: biotin (vit. H), thiamine (vit. B) and with liponic acid. Sulphur diminishes the toxicity of selen and is antagonistic in relation to heavy metals. Low proportion of sulphur to heavy metals (lead, mercury, cadmium, copper) signifies increased requirement of proteins containing sulphuric amino acids (cysteine, cistine, methionine). The content of sulphur in full blood is 38+/-l0 mmol/l, in plasma 24+/-l0 mmol/l and in erythrocytes 58+/-10 mmol/l. The content of sulphur depends on the quantity of consumed protein. Increased concentration of sulphur can be seen in kidney insufficiency, intestinal obstruction, leukaemias.

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.

Ba - Barium

Barium content in human blood is 0,5 -2,4 μg/l. Barium accumulates mainly in the bones (70 μg/g). This element can be extremely toxic if present in the form of compounds easily soluble in water: barium chloride $BaCl_2$, barium nitrate $Ba(NO_3)_2$ or barium carbonate $BaCO_3$. Compounds not easily soluble in water, such as barium sulphate, are not harmful for humans and they are used in radiology as the so-called barium meal for stomach and intestines X-rays. Toxic dose for humans is 200 mg of barium, and daily intake with food about 600-750 μg. High concentration of barium in water is connected with hypertension and heart diseases. Barium poisoning in the first stage manifests as gastrointestinal disturbances, then muscular paresis, especially of the upper limbs and neck, also difficulties in breathing. Barium also inhibits the process of bone mineralisation, where it easily deposits. The mechanism of toxic activity of this element is expelling potassium and binding sulphate ions.

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.

DIARY

Dear Patient, for better control of the organism's condition during the recommended 30-day nutrition program, we suggest completing the attached table every day. We would like to remind you that only following the whole program, consisting of the recommended diet, supplementation and physical activity will enable you to attain the optimal health condition.

Measure yourself, please and record the measurement results:

Before the 30 – day program	**After the 30 – day program**
Weight= ..... kg	Weight= ..... kg
Measurement values= ..... cm	Measurement values= ..... cm
Chest circumference= ..... cm	Chest circumference= ..... cm
Waist circumference= ..... cm	Waist circumference= ..... cm
Hip circumference= ..... cm	Hip circumference= ..... cm

Note

Check your weight in the morning, before eating, after urinating, with no clothes on.

Record the subjective assessment of your condition every evening: **1 - good, 0 - bad.** After completing the table, all the data in the SUBJECTIVE CONDITION column should be summed up.

Subjective condition: 30 - 15 score:

Congratulations! Your health and psychosomatic condition is good. The second part of the supplementation program should stabilize good health tendencies. If your subjective condition remains good during te second part of the program, then you can undergo Nutritional Status Diagnostics (NSD) within the next two years (from the date of the first Elemental Hair Analysis).

Subjective condition: 14 - 8 score:

Regular use of the first part of the supplementation program for a further month is recommended. More attention should be paid to appropriate diet and physical activity. If the psychosomatic condition is good during the second part of the program, Nutritional Status Diagnostics can be performed within the next 2 years (from the date of the first Elemental Hair Analysis.

Subjective condition: 7 - 0 score:

Continuation of the first part of the supplementation program for further 3 months is necessary. More attention should be paid to the diet . Regular physical activity is necessary. A medical consultation and control examinations are recommended.

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