

Use of Natural Herbal Remedies as Immunity Protectors Metabolically Similar to the Body

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Intake of nutrients and minor food components is a factor largely determining the health of the population. The advantage of immunity protection exposure to natural food herbal remedies is the content of a wide range of biologically active substances similar to the body and affecting the human in accordance with the wildlife interaction laws. This is why the topic of nutritional correction of health with natural herbal food, immunity protectors metabolically similar to the body, is essential to maintain human health.

Key words: Nutritional correction of health, natural herbal immunity protectors.

Aging of the human population is becoming a more important economic, social and health problem throughout the world. Given the increase in the proportion of older people, it is important to solve the problem of conservation of physical and psychological possibilities of personal fulfillment^{1, 2, 3, 4, 5, 6, 7}. Nutrition provides an extension of quality life by 25-40%, so the nutritional substances that inhibit aging and increase longevity are considered as geroprotectors that strengthen immunity^{4, 8, 9}. Immunity, as a complex system to maintain homeostasis, the body's defense against infection and external aggressions, is an important link in maintaining the quality of health. Both a lack of immunity and excessive use of immunomodulators that promote the development of severe autoimmune diseases are harmful^{10, 11}. The advantage of herbal medicine as a way of immunity

protecting natural exposure to herbal remedies is the content of a wide range of biologically active substances similar to the body, which affect a human in accordance with the wildlife interaction laws^{12, 13}. So the topic of the use of natural herbal remedies as immunity protectors metabolically similar to the body is essential to maintain human health.

Main part

Currently, issues of healthy nutrition are elevated to the rank of state policy in many countries. Diet is an effective means of maintaining physical and mental health. Unfavorable food, from the viewpoint of mental reactivity of the organism, is the one overloaded with easily digestible carbohydrates, such as sugar, confectionery, including from high-grade flour, coffee, strong tea, fatty meats, poultry, fish, fried foods. Increased consumption of vegetables, fruits, berries, products from crude flour and bran reduce neural and emotional excitability^{13, 14}.

Nutritional factor, a violation of the nutrition structure, causes irreparable damage to human health. A.D. Sineschekov (1965) showed stabilization mechanisms of endogenous nutrients

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in the lumen of the digestive tract. Chyme of constant composition is formed in the duodenum due to an intensive exchange of nutrients between consumed food components and nutrients secreted from the wall of the gastrointestinal tract. This phenomenon is called chyme homeostasis¹⁵. Later, the homeostasis was explained with the transport conveyor of the symbiotic intestinal microflora¹⁶. The common ecological microflora system is characteristic of a particular biotope of the human body, ensures human health due to the phenomenon of mutual molecular mimicry that supports biochemical, metabolic and immune balance. Normal intestine flora performs critical functions: 1. Metabolic; 2. Detoxification; 3. Immunotropic (involvement of secretory globulins – Jg A and nonspecific factors of protection in the synthesis; participation in the maturation of the intestine lymphoid apparatus). The interrelation between disruption of the normal symbiotic existence of microflora and the development of diseases of the microorganism in violation of nutrition structure, mode of eating and fast food consumption is revealed^{8, 9, 15}.

In the United States, the death rate from cardiovascular disease has decreased from 48% to 27.8% between 1977 and 2007. The results were reflected by the active promotion of plant-based food – vegetables, fruits, berries, mushrooms, honey, nuts, grains, food with a reduced amount of fat. Japan since 2001 legislatively imposed functional food – plant-based products that ensure the prevention of age-related diseases^{14, 17, 18}. Important parts of the diet are molecular composition that supports the basic metabolism and energy; nutrients; various regulatory substances synthesized by both the digestive system and intestinal microflora; and ballast components (dietary fiber) that ensure resorption and excretion of products of incomplete processing of food, toxins, etc. It is a role of functional nutrition. In Russia, high functional food products have been producing since the beginning of the 21st century. They use only natural phytocomponents: flax seeds, thistle seeds, pine nuts, pollen, Jerusalem artichokes, spirulina, grape seeds, cereals. The study showed that the use of these products provides a steady detoxification, prebiotic, hepatoprotective effect, improves intestinal microbiocenosis, restores motor-

evacuation function of the gallbladder, and creates metabolic conditions for the normalization of enterohepatic circulation of bile acids and digestion. Reduced hyperlipidemia, increased antioxidant function due to stimulating the lipolysis reduces abdominal obesity and normalizes blood pressure. The decrease in body mass index is physiological due to the low caloric content of whole-grain cereals that contain large amounts of fiber and nutrients^{19, 20}.

Many researchers noted the importance of the complex of metabolic remedies to restore the disturbed levels of macro- and micronutrients in order to improve metabolism using the correction of nutritional status with the help of *natural herbal* ingredients in the most accessible for the body, digestible, environmentally friendly form^{12, 15, 21, 22, 23}. Intake of both nutrients and minor food components is a factor that largely determines the health of the population. Both fortified food products and functional foods that exhibit proven beneficial effect on physiological functions of the body are used²⁴. The European Union suggests a list of proven health properties of a number of nutrients – vitamins (Table 1) and trace elements (Table 2)²⁵. At that, the stringent requirements are made to the form in which vitamins and minerals should be present in the diet – it should be *organic compounds of micronutrients that are part of the traditional natural organic food products* as metabolically close to the body.

Effects of some minor physiologically active food components on the body studied in Russia⁴ are presented in Table 3.

Both causes of cardiovascular disease (CVD) and their worsening by a nutritional factor are now widely studied. In case of violation of lipid metabolism, correction of dietary fat component is especially important. It is proved that an increased risk of CVD occurs when consuming the saturated fatty acids contained in the animal products, as well as trans-isomers of fatty acids formed during the hydrogenation of polyunsaturated fatty acids (PUFAs) in the manufacture of margarines. Conversely, the use of PUFAs and monounsaturated fatty acids (MUFAs), the main representative being the oleic acid present in large quantities in olive oil, dramatically reduces the risk of CVD²⁶. One of the most important properties of unsaturated fats is

their ability to peroxidation. This is necessary for regulation of the cell membranes renewal, their permeability, as well as synthesis of regulators of the immune defense: prostaglandins, leukotrienes and other biologically active substances²⁷. The most important representatives of the PUFAs class are the omega-6 (linoleic acid) contained in vegetable oils – sunflower(!), corn, cotton; and omega-3 (linolenic acid) contained in both marine fish fat, fish oil and vegetable oils - flax(!), soya, rapeseed, mustard, sesame, peanut. Castor oil (hazelnut oil) is unique among all fats and oils: this is the only source of 18 – carbon hydroxylated fatty acid having one double bond – ricinoleic acid (12-hydroxyoleic MUFA acid) is about 87% of the

fatty acids. Properties of castor oil base perfectly inhibit the development and spread of pathogenic bacteria and microorganisms, have anti-inflammatory effects²⁸.

It is desirable that vegetable oils made up at least half the fat of the diet since they also contain such biologically active anti-atherogenic components as phospholipids, squalene, phytosterols and phytostanols (saturated derivatives of phytosterols). Phospholipids have antioxidant, hypolipidemic effect, stabilize dissolved cholesterol in bile and decrease the absorption of cholesterol in the intestine. Most of the phospholipids are lost in the refining of vegetable oils. Phytosterols and phytostanols are

Table 1. The list of proven claims about the health benefits in relation to vitamins – antioxidants.

Vitamins:	Function:
A (retinol)	- maintaining the normal state of the skin and mucous membranes - normalization of iron metabolism - maintaining vision- proper functioning of the immune system
B3 (niacin)	- normalization of energy metabolism - normal functioning of the nervous system
Ñ	- maintaining the normal state of the skin and mucous membranes - protection of body cells against oxidative damage - normalization of collagen formation and functioning of bones, teeth, cartilage, gums, skin, blood vessels - normal functioning of the nervous system - normalization of energy metabolism - proper functioning of the immune system - normal functioning of the immune system during and after extreme loads

Table 2. The list of proven claims about the health benefits in relation to trace elements – antioxidants.

Trace element	Function:
Manganese	- normalization of energy metabolism - protection of body cells against oxidative damage - maintaining normal bone health
Copper	- protection of body cells against oxidative damage - maintaining the normal state of the connective tissue - normal skin pigmentation
Selenium	- protection of body cells against oxidative damage - proper functioning of the immune system
Zinc	- protection of body cells against oxidative damage - cognitive activity - maintaining normal metabolism of fatty acids - maintaining normal vision - maintaining normal bone health - proper functioning of the immune system

Table 3. Effects of some physiologically active food ingredients, recommended for introduction into functional nutrition that slows down aging.

Ingredient	Some mechanisms of effect
Thiamin	Normalizes cholesterol metabolism, improves memory, mental activity; gives a feeling of cheerfulness, optimism, relieves irritability
Ascorbic acid	Slows the development of osteoporosis, has anti-teratogenic and detoxifying effect; maintains the elasticity and strength of vessel walls; normalizes cholesterol metabolism, collagen metabolism
Pyridoxine	Normalizes cholesterol metabolism; reduces blood homocysteine ; slows the development of osteoporosis; shows anti-teratogenic and detoxifying effect; improves memory and mental activity
Folic acid	Reduces blood homocysteine ; risk of hypertension, atherosclerosis, Alzheimer's disease; anti-anemic action
Cyanocobalamin	Reduces blood homocysteine; improves memory, mental activity; stimulates the formation of methionine and choline, synthesis of nucleic acids; anti-anemic action
Pantothenic acid	Anti-stress effect; slows down skin aging, hair loss, discoloration of hair; contributes to the preservation of youth, vitality, physical and mental performance, resistance to infections
Biotin	Regulates the function of sexual glands, is involved in the metabolism of fats and amino acids, modifies apoptosis, is involved in the processes related to diabetes, atherosclerosis, tumors, etc.
Vitamin A, Beta-carotene	Slows the development of osteoporosis, has anti-teratogenic, detoxifying, anti-oxidant effect; resistance to infections
Tocopherols	Slow the development of osteoporosis, have anti-teratogenic, detoxifying, anti-oxidant effect; improve the functioning of the immune system
Bioflavonoids	Antioxidant, anti-inflammatory, antimicrobial, antiviral, capillary tonic, immunostimulatory effects
Organic acids (VFA, lactic, succinic, etc.).	Suppress putrefactive microflora; regulate apoptosis, energy supply to the cells, their proliferation and differentiation, mineral metabolism; have antioxidant and tonic effect, etc.
Calcium	Contributes to the maintenance of sexual function of men, longer preservation of youth, vitality, physical and mental performance: reduces the risk of hypertension, atherosclerosis, thrombosis; normalizes the acid-alkaline balance
Copper	Normalizes the production of collagen; reduces the risk of bone fractures and fissures
Magnesium	Antiseptic, vasodilatory effect; stimulates peristalsis, increases bile secretion; contributes to the maintenance of sexual function of men, longer preservation of youth, vitality, physical and mental performance; slows the development of chronic fatigue syndrome; shows anti-sclerotic effect
Manganese	Anti-anemic, anti-sclerotic, immune-stimulating, anti-aging effect
Potassium	Slows the development of chronic fatigue syndrome, normalizes acid-base balance; shows anti-sclerotic effect, enhances the contraction of the heart muscle
Germanium	Slows the development of osteoporosis, has a detoxifying and anti-teratogenic effect
Selenium	Antioxidant effect, helps to maintain sexual function of men, longer preservation of youth, vitality, physical and mental performance
Chrome	Promotes a long preservation of youth, vitality, physical and mental performance, maintaining sexual function of men
Silicon	Anti-sclerotic effect; contributes to long preservation of youth, vitality, physical and mental performance, maintaining sexual function of men
Zinc	Immunostimulatory effects
Bifidus bacteria, lactobacilli; prebiotics (nulin,	Normalize the composition of intestinal microflora in the digestive tract, are involved in the regulation of metabolic and immune processes, increase

oligosaccharides, etc.).	resistance to infections, slow the progression of osteoporosis, cataracts, support muscle mass; reduce symptoms of undigested lactose, etc.
Vegetable fibers	Normalizes the composition of intestinal microflora, the functions of the digestive tract
Methionine, cysteine, valine, glycine	Delay aging, increase life expectancy. Reduction of tryptophan in the diet has a similar effect
L-glutamine	The best source of nitrogen; promotes the formation of endogenous antioxidant glutathione
Arginine	Slows the development of osteoporosis, aging; increases life expectancy; helps reduce blood pressure, wound healing, recovery of sexual function; supports the immune system
Lysine	Slows the development of osteoporosis
RNA, DNA	Contribute to the preservation of youth, vitality, physical mental capacity, sexual function of men
Linoleic, eicosapentaenoic acid	Antioxidant, antianemic action; maintain physical and mental status, normalize cholesterol metabolism; restore the structure and function of cell membranes
Choline	Anti-sclerotic effect
Citamins	Restore mental ability, normalize the activity of cardiovascular, excretory, immune, endocrine and other systems

not absorbed in the gastrointestinal tract and have only a local effect, so they are a safe means and are contained in soybean, rapeseed, coconut oil, coniferous tree oil, seeds, nuts, fruits and vegetables. Squalene has an antioxidant, lipid-lowering effect²⁶

Use of dietary fiber is important for lipid metabolism (cellulose, hemicellulose, pectin). They are contained in cereals, vegetables and fruits, are not digested and absorbed in the gastrointestinal tract, but inactivate and eliminate excess cholesterol.

Nutritional correction of blood pressure requires optimization of the mineral composition of the diet – sodium, potassium, calcium (has proven antihypertensive effect, regulates the metabolism of lipids, activation of a number of elements), magnesium (a cofactor for over 250 enzymes involved in carbohydrate and energy metabolism)²⁶. Nutritional correction of many diseases, including their prevention using food of plant origin, is becoming increasingly important. The structure and use of a plurality of medicinal plants with immunity protecting properties have been studied. They are briar, Chinese magnolia leaves, nettle leaves, fruits of red and black mountain ash, ginger officinale, cabbage, Laminaria japonica, onion, garlic, lemon, burdock, celery, etc¹⁰.

CONCLUSIONS

As can be seen from the above, natural herbal remedies as metabolically close immunity protectors to the body have the greatest value for the health. It is important to further study the results of immunity protecting, organ protecting effect on the human body of a variety of plant-based foods. The author expresses gratitude to N.B. Kalugina for the highly intelligent technical support.

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