**ECOLOGICAL IMPACT OF WIND­DIESEL POWER PLANTS ON ECOSYSTEM   
AND POPULATION HEALTH**

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In electrification of the Eastern regions of Russia, an important part is assigned to the small­scale power distributed generation. In this regard, it is actual to construct wind­diesel power plants (WDPP), which impact on humans and environment is so far poorly studied. The results of a theoretical research of WDPP negative impact on health of the population and ecosystem of the territories of the East of Russia which were not covered by the centralized power supply have been given in the article. The assessment of indicators of atmospheric air pollution (specific and absolute values of the specified mass of annual emission of harmful substances, volumes of greenhouse gases emission, formation of acid rainfall, substances causing eutrophication) and physical pollution (noise, electromagnetic field) during use of WDPP of various rated capacity. Calculations have been done for 692 types of diesel engines and 97 models of wind power installations. The received results were compared with the level of environmental pollution during work of large thermal power plants. There have been given graphic dependences of the specified mass of the emitted harmful substances on power of the diesel engines, a noise level created by the wind power installations, on remoteness of settlements and power of the power installations, as well as a ratio of volume of harmful substances annual emission in the atmosphere during work of WDPP and the large thermal power plants. It has been shown that electrification of the Eastern regions of Russia on the basis of development of small­scale power distributed generation would have an ecological focus.

**Keywords:** еmissions of harmful substances, acid rainfall, eutrophication, noise level, electromagnetic field, ecosystem, wind­diesel power plant.

**THE INFLUENCE OF NUTRITION ON IMMUNE RESPONSE OF PEOPLE IN THE NORTH**

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In conditions of ecological trouble, changed quality of food, poor diet, one of the urgent problems of our time is the problem of digestive process disorders. The digestive system contributes significantly to formation and maintenance of functional activity of the immune system; the most significant amount of immune competent cells is concentrated in the intestine, which plays an important role in generation of the entire immune system. The paper has presented the results of a study of influence of diet types on the immune status of the inhabitants of the North. It has been found that prevalence of seafood in the diet stimulated motor activity of the gastrointestinal tract and the mucous barrier protective properties by increasing content of IgA, gastrin­17, SP neurotransmitter in blood. Predominant consumption of seafood influences differentiation and proliferation of lymphocytes with formation of T­helpers 2 type and stimulates antibody formation. This causes activation of the reaginic mechanism and, as a result, enhancement of the gastrointestinal tract mucous barrier function, the increased level of polysaccharides of the mucin type in the epithelial cells. It has been detected that the level of content of the carrier IgG to food antigens depended on frequency of products’ use in diets.

**Keywords:** cellular and humoral immunity, digestion mediators, nutrition, inhabitants of the North

**SIGNIFICANCE OF LEPTIN LEVEL IN ASSESSMENT OF ADAPTIVE IMMUNITY**

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Adipokine leptin is produced by the adipose tissue in quantities directly proportional to its mass. It is well known as a regulator of energy exchange, which provides control of energy consumption and expenditures. New information becomes available about its participation in control of some other physiological functions including functioning of immune competent cells.

We have determined parameters of the immune status and concentration of leptin in blood plasma in 37 healthy volunteers aged 22-24 years living in Arkhangelsk. All volunteers had physical activity in gym 2-3 times a week, their body mass index fell in the normal range corresponding to the interval 19.5 - 23.8. We have studied the association of leptin concentration with concentration of immune competent cells and cytokines in blood. It has been found that quantitative differences in the leptin level directly corresponded to the changes of concentration of lymphocytes expressing receptors CD3, СD4, СD8, СD10, СD25, СD71, СD95, HLADR, while the amount of CD23+ cells and IL-4 concentration was changed in the opposite way. We have also determined the character of changes in leptin and cytokines TNF-α and IFN-γ concentrations blood. Using the normalized varimax rotation algorithm, we have built a three-factor model that described satisfactorily the association between leptin and T-lymphocytes’ phenotypes, constituting its pleiotropic effect on T-cell subsets.

**Key words:** leptin, cytokines, lymphocytes, interaction, adaptive immunity

**CORRELATION OF RECEPTORS’ EXTRACELLULAR POOL AND IMMUNE RESPONSE LEVEL IN INDIVIDUALS LIVING IN ARCTIC CONDITIONS**

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The paper has presented data on the study of a relationship of activity of the immune response and the accumulation of a pool of free molecules involved in the processes of cell cooperation, activation of immune cells and their apoptosis in villagers of Revda, the Levozersky District of the Murmansk Region. The study has involved 91 people, 77 women and 14 men aged from 21 to 55 years. In order to study correlation levels of the immune response and a free pool of receptors, the initial values ​​in the database have been divided into samples with high and low contents of free and membrane­selectin ligand; free protein cell adhesion sCD324; transferrin­free and membrane transferrin receptors; apoptosis protein sAPO­1 / Fas ligand sFasL. In the examined patients, there have been found high concentrations of IgA and IgM, there have been detected signs of retardation of a switch in synthesis from antibodies IgM to IgG. The identified pattern indicates a special role of cellular interaction by way of L­selectin in realization of IgE antibody formation. Accumulation of free L­selectin occurred almost at all stages of the immune response development, as well as during the increase in the content of CEA, due to activation of process reactivity in the mucous barrier. There has not been established influence of free transferrin receptor (sCD71) on the content of the membrane receptor for transferrin (mCD71), transferrin, and immunoglobulins, was probably associated with 2­fold concentration of regulatory T­lymphocytes (SD45RA). Accumulation of the free pool of receptors involved in the reactions of apoptosis of the immune competent cells was manifested by decreased activity of B­lymphocytes apoptosis, thus prolonging the period of antibody formation.

**Key words:** immunoglobulins, circulating immune complexes, extracellular pool of receptors, phenotypes of lymphocytes, T­and B­lymphocytes.

**CYTOKINE REGULATION OF PROLIFERATIVE ACTIVITY OF PERIPHERAL BLOOD CELLS**

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The purpose of the research was to study effects of various cytokines on proliferation of peripheral blood white cells. There has been carried out an immunological examination of 234 healthy people aged 20 to 50 years, which included a study of immunograms, hemograms, neutrograms, monocytograms and lymphocytograms. In serum with use of ELISA method, there was determined content of tumor markers: carcinoembryonic antigen (CEA) and alpha­fetoprotein (AFP), as well as cytokines: IL­6, IL­4, IL­10, TNF­α and IFN­γ. The same type of inhibitory effect of elevated concentrations of cytokines, the mechanism of which is probably the induction of expression of tyrosine kinases has been shown. It has been shown that cytokines in concentrations that did not exceed the physiological norms and were close to the average content increased proliferation and differentiation of T and B­lymphocytes thus stimulating cell­mediated and antibody­dependent immune responses. High concentrations of proinflammatory cytokines lead to a sharp reduction in the number of peripheral blood cells with markers of both early and late activation of proliferation without further development of cell­mediated and antibody­dependent responses. Increased concentrations of IL­6 and TNF­α in blood serum more than 20 pg / ml reduced content of CEA and AFD, respectively.

**Keywords:** cytokines, proliferation, T­ and B­lymphocytes, neutrophils, monocytes, mitogens

**THE INVOLVEMENT OF LEPTIN IN THE REGULATION OF PROGRAMMED CELL DEATH IN PERSONS WITH DYSLIPIDEMIA**

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Indicators of programmed cell death (apoptosis) of immunocompetent cells of peripheral blood in the conditions of various level of a leptin at persons with a dislipidemiya are studied. Research was conducted with observance of the main standards of biomedical ethics. For realization of a goal two groups of the examined persons were allocated: with conditionally raised (>25 ng/ml, n = 13) and conditionally lowered (<10 ng/ml, n = 13) the content in blood of a leptin. Groups were almost equivalent on age (52,5 ± 1,4) and (50,7 ± 2,4) years and a sex (woman). Apoptosis of lymphocytes was estimated by method of a flowing laser tsitoflyuorimetriya with use FITC­marked of an anneksin of V (“Beckman Coulter”, USA). Determination of concentration of a leptin, cytokin and IgE carried out to blood by method of the solid­phase immunofermental analysis. In dabs of blood painted according to Romanovsky­Gimz studied a monocytogramma and to a neutrogramma. The maintenance of phenotypes of lymphocytes was determined by method of a double peroksidazny tag with use of monoclonal antibodies. Research type retrospective, selections casual, one­stage. Population ­ inhabitants of the north of the European territory of Russia. Borders of normal distribution of quantitative indices defined by means of Shapiro criterion ­ Uilka. Reliability of distinctions between groups was estimated by means of parametrical t­criterion of Student and Uilkokson criterion. It is established that at increase of the maintenance of a leptin the differentiation and apoptosis of lymphocytes and neutrophils accrues; intensity of apoptosis and proliferation of monocytes does not change, but processes of their maturing and activization amplify. On this background concentration of IgE and IFN­γ that is also associated with accumulation of a leptin in blood increase.

**Keywords:** dyslipidemia, apoptosis, proliferation, lymphocyte, neutrophil, monocyte

**THE INFLUENCE OF MEXIDOL ON MORPHOLOGICAL CHANGES IN THE STRUCTURE OF THE LIVER OF RATS AFTER CHRONIC BANKOL INTOXICATION**

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It has been established, that modeling of acute or chronic bankol intoxication in Vistar rats was accompanied by apparent structural changes in the liver tissue, that manifested in the increased proportion of necrotizing and burned­out tissues, widening of the intrahepatic sinuses, stroma edema, the increased number of binuclear cells. Use of mexidol during chronic bankol injections caused a decrease in the proportion of necrotizing and burned­out tissues by 1.68 times (p = 0.0003) as well as intensification of reparative processes by 2.02 times (p = 0.0004), that manifested in the increased number of binuclear cells and the number of cells, in which nuclei there were two or more nucleoli.

**Keywords:** chronic intoxication, bankol, liver, mexidol

MENTAL IMMUNITY AS BIO­PSYCHO­SOCIO­SPIRITUAL MATRIX   
OF IDENTITY AND PERSONALITY AND SOCIETY SAFETY BASIS

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There has been grounded assessment of mental immunity as a bio­psycho­socio­spiritual defense of identity and a basis of personality and society safety. Its resource characteristics and functional mechanisms have been systematized. With the use of the epidemical model of the acquired mental immunodeficiency syndrome, there has been described its phenomenology according to four blocks of psychogenesis and sociogenesis, biogenesis and animogenesis. There have been separated algorithms of arrangement of systemic and block­module protection of public conscience and public health in the hybrid world identity crisis. There has been grounded the synergetic approach to mental safety providing protection of individual and public conscience. Its main directions and target levels in formation of state­civil identity have been separated. We have proposed integral strategies of mental safety provision based on the synergetic technological platform of non­departmental mental health service. We have grounded a mission of mentality medicine consisting of adaptive conscience and health management as a priority of national security in the era of hybrid wars.

**Key words:** mental immunity, mental safety, acquired mental immunodeficiency syndrome, mental epidemics, protection strategies, state­civil identity.

**ASSESSMENT OF PEPTIC ULCER INCIDENCE AMONG POPULATION   
OF EUROPEAN NORTH ОF RUSSIA**

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The problem of the peptic ulcer disease is one of the most urgent problems in gastroenterology. In spite of modern achievements, this disease is very hard to nurse. The article has highlighted the results of the ulcer disease epidemiological research in the regions of the European North оf Russia in the period 2009­2013. The analysis of the data has shown that in five regions of the European North, the total and primary peptic ulcer incidence was above the average for the Russian Federation. In the Republic of Karelia (RK), the Komi Republic and the Arkhangelsk Region, the indicators of both the general and primary peptic ulcer incidence were the highest in the period 2009­2013. Karelia was the most disadvantaged region, where both the general and primary ulcer disease incidence was 1.4­1.6­fold higher than the average for the Russian Federation over the past five years. In the structure of the population mortality, diseases of the digestive tract consistently ranked fifth with the proportion 4.6­7.0% without a tendency to decrease.

**Keywords:** ulcer, European North, incidence

**VANADIUM ESSENTIAL ROLE AND TOXIC EFFECTS**

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At present, the vanadium biological role as an essential microelement is ambiguously perceived by scientists of biomedical research directions. Despite the known expressed toxicity of vanadium various biological effects of this element when administered to the body are of interest. It is shown that vanadium compounds both cause various negative effects playing a role in the pathogenesis of several human diseases, and provide a sufficiently wide range of physiological functions. Vanadium deficiency leads to dysfunction of vital enzyme systems, such as ATPase, protein, ribonuclease and phosphatase, thyroid function regulation, glucose and lipid metabolism, gene of tumor necrosis factor­alpha, protein­activator­1, Interleukin­8, ras, c­raf­1, mitogen­activated protein kinase, p53, nuclear factor kappa B. This indicates vanadium antidiabetic and anticarcinogenic activity. These properties characterize the vanadium as an element of great prospects for the use in dietary supplements and pharmaceutical preparations for the prevention and treatment of socially significant diseases such as diabetes, cancer. This review summarizes the studies of vanadium biological role and its biochemical functions, estimated by its influence on experimental models and human organism.

**Keywords:** vanadium, essential role, toxic effects, anticarcinogenic activity, antidiabetic activity