THE IMPACT OF THE REMEDIATED WASTES OF MINING PROCESSING PLANT
ON CYTOGENETIC INDICES IN HEALTHY CHILDREN

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Environmental pollution with heavy metals and the effects of this pollution have remained challenging since long. Particular interest represents the effects of prolonged exposure to low doses of heavy metals. In order to determine the level of environmental pollution the content of heavy metals in drinking water, soils, pasture grasses, potatoes, and milk produced in the farms and in the hair of children was determined using x­ray fluorescence method and atomic absorption spectrophotometry. Children of primary school age from the vicinity of reclaimed tailing dump of tungesto­molybdic factory and clean zone were examined. To evaluate the cytogenetic status of the children the multisystemic karyological test was used. Soil, drinking water, potatoes and milk in the area of the reclaimed tailing dump were characterized by a low level of heavy metal pollution. There were no significant differences in the heavy metal concentration in children’s body from both zones due to the high individual variability. The frequency of micronuclei (4,1 times), biomarkers of cell proliferation (1,5 times), destruction of cell nuclei (2 times) and frequency of apoptotic cells (1,2 times) was higher in children from polluted area. Thus, we identified an implicit genotoxic effect of disposed wastes on the child population living in close proximity to them, which led to a significant increase in the number of children belonging to the groups of medium and high risk.

**Keywords:** mining processing plant, tungesto­molybdic wastes, heavy metals, children

STRUCTURAL DAMAGES OF HUMAN DNA OF PERIPHERAL BLOOD LYMPHOCYTES UNDER THE INFLUENCE OF PHYSICAL FACTORS

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Increase of electromagnetic radiations level in the human environment is connected with the accelerated rates of information and communication development. At the same time, ability of peripheral blood lymphocytes of the irradiated persons to the adaptive response in long date after radiation allows to consider them as a biological marker of a functional status of these cells. The quantity of DNA single­strand breaks in peripheral blood lymphocytes affected by various physical factors: the microwave oven ­ gamma and laser radiation, and after lymphocytes incubating in the environment containing silver nanoparticles was defined by means of fluorescent spectroscopy. It is shown that with increase in microwave radiation frequency DNA quantity in lymphocytes increases in comparison with control samples: under the influence of radiation with a frequency of 3,5 GHz at 32,3 ± 0,9 %, with a frequency of 50 GHz at 40,1 ± 1,1 %, with a frequency of 70 GHz at 49,8 ± 0,7 %. Affection of 137Cs gamma rays preparation with 0,104 MBK activity induces dose­related increase of DNA single­strand breaks. Quantity increase of DNA single­strand breaks is observed after laser irradiation at the wavelength of 510,6 nm to 18,1 ± 0,7 % (irradiation time – 3 min) and to 6,1 ± 0,5 % (irradiation time ­5 min), at the wavelength of 578,2 nm to 18,1 ± 0,7 % (irradiation time – 3 min) and to 22,3 ± 0,9 % (irradiation time – 5 min). DNA single­strand breaks quantity measurements after lymphocytes incubation in the normal saline containing silver nanoparticles showed that in the studied range of silver nanoparticles concentration with the diameter of 12 nm ± 10%(1,863 – 0,621 mkg/l) occur structural failure of DNA molecules. On the basis of the obtained data the conclusion has been made that DNA single­strand breaks count in the immune competent cells can become a tool for research of physical factors influence on a human body.

**Keywords:** DNA single­strand breaks, lymphocytes, fluorescent spectroscopy, gamma, the microwave oven – laser irradiation, silver nanoparticles, influence of physical factors on a human body

ASSESSMENT OF PARENTS’ SATISFACTION WITH PRIMARY HEALTH CARE PROVIDED TO THEIR CHILDREN IN POLYCLINICS

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*Background*. Patients’ satisfaction with medical care as a “subjective” component of a medical organization rating can be distorted by some factors. *The aim of this study* was to identify factors related to the medical care process in children’s polyclinics that determine the parents’ satisfaction with primary health care provided to their children. *Methods*. The sociological study by means of questioning of 215 parents (mothers) of children patients (0­17 years old) who received medical care in children’s polyclinics in Arkhangelsk was carried out. Parents’ satisfaction with primary health care was assessed according to three criteria: organization of the children’s polyclinics work, satisfaction with the service process, and the presence (absence) of additional financial expenses for medical drugs. Binary logistic regression analysis was used to identify factors associated with the parents’ satisfaction with primary health care provided to their children. *Results*. A half of the respondents (55.8 %, 95 % CI: 49.4­62.0) was satisfied with primary health care provided to their children. The respondents’ satisfaction with medical care was significantly influenced by factors related to their personal communication with the pediatricians and medical personnel. Long wait (more than 1 month) for laboratory and instrumental examinations, additional consultations with specialists were not statistically significantly associated with parents’ satisfaction with primary health care. *Conclusion*. Results of the study help to understand the mechanism of the development of the “patients’ satisfaction with medical care”; indicate that “the proportion of parents who are satisfied with medical care” is not an independent criterion for the quality of medical care in children’s polyclinics. Parents’ satisfaction with primary health care provided to their children is determined by factors related to the quality of personal contact with the pediatrician.

**Keywords:** primary health care to children, satisfaction with medical care, children’s polyclinics

THE RELATIONSHIP OF ANXIETY LEVEL AND REGULATORY PROFILE OF CARDIAC RHYTHM IN MILITARY STUDENTS IN CONDITIONS OF EXAMINATION

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The article presents the research results of a regulatory profile of cardiac rhythm in a situation of examination, depending on the level of personal and state anxiety. In order to identify the characteristics of a psychosomatic response to the situation of examination stress the level of anxiety was assessed, which made the basis for ranking groups (low­, moderate­, high – anxious cadets). Cardiac rhythm variability was investigated by the method of R. M. Baevsky, and the statistical and spectral analysis was estimated. The study involved 42 apparently healthy cadets of the first course, 35 girls and 7 boys. The average age was (17.5 ± 0.5) years. A cross­sectional (transverse) study was carried out which protocol included 2 stages: the first stage: anxiety level was determined before the exam, functioning parameters of cardiovascular system and cardiac rhythm variability were registered. The second stage: registration of above mentioned parameters immediately after the examination. The analysis of the research results showed that the level of state anxiety before the exam in all groups was above the level of trait anxiety, which was seen as a natural reaction to the situation of the examination. The reaction of the cardiovascular system and the mechanisms of the autonomic regulation of heart rhythm in a standard situation such as examination were provocative depending on the level of anxiety. Highly anxious examinees showed a higher activation of sympathetic part of autonomic division of nervous system which indicated the generalization of anxiety and possibilities of its somatization.

**Keywords:** anxiety, autonomic regulation of the heart, cadets, examination stress

NEUROPHYSIOLOGICAL CORRELATES OF DEPRESSIVE DISORDERS
(Literaure Review)

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The article presents a studies review of the neurophysiological characteristics of depressive disorders. At the bottom for these disorders lies a complex interaction of social, psychological and biological factors. The incidence in all age groups ranging from 3 to 17%. The high incidence of depressive disorders, complex course, tendency to chronicity, and resistance to medical treatment necessitate a detailed study of these states. The paper reflects the importance of electroencephalography (EEG). Pathological EEG signs are detected in 70­80 % of depressed patients. Thanks to modern methods of mathematical analysis and processing of electroencephalographic data diagnostic and research significance of this method increases. Mathematical analysis of the EEG gives more detailed information about the functional state of the brain, expands the understanding of the mechanisms of interaction between different areas of the brain, which increases the possibilities of diagnostics and allows putting forward new tasks in the study of the brain activity. Clinical features of depressive disorders are reflected in the synchronous generation of electrical signals depending on the etiological belonging of depressive symptom and domination in the structure of depressive disorder of one or another affect. The use of modern methods of imaging studies (single photon emission computed tomography, positron emission tomography and magnetic resonance imaging) also allows to identify the functional relationship of the complex interaction of different brain regions characteristic of depressive states.

**Keywords:** depression, EEG, modern imaging techniques

ENDOECOLOGICAL MODEL OF RELATIONSHIP BETWEEN LIVER DYSFUNCTION
AND LARGE INTESTINE DYSBIOSIS IN ACUTE ALCOHOLIC PSYCHOSIS

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The results of biochemical parameters evaluation of blood dynamics and large intestine endoecology in patients with a syndrome of dependence on alcohol are presented. Friendly changes in enzymatic activity of blood serum and quantitative content of the main microflora representatives of large intestine in patients with acute alcoholic psychosis (AAP) are identified. It was produced ranking indicators of serum enzymes, lipids, pigment metabolism with subsequent calculation of the deviations from the physiological norm limits. The total degree of deviation indicators was considered as independent variables, the relationship that reflects a comprehensive assessment of the functional state of the liver to the extent that the large intestine dysbiosis. A mathematical model of regression­type complex quantitative estimation of biochemical status and microbiocenosis rectum at the AAP, based on the scale level, which reflects the cumulative severity of the patient’s existing endoecological violations in the values of the analyzed parameters is made. Dynamics assessment of analyzed indicators changes in the course of treatment has allowed to identify the most important biochemical and microbiological parameters for future inclusion as predictors of liver disease progression risk in the development in a mathematical model of the relationship reducing the effectiveness of liver detoxification and dysbiotic shifts the large intestine microflora. The proposed approach can be used to facilitate the evaluation of the recovery of liver function in the process of the treatment on the level of the share of the mutual influence of the recovery in the intestinal microbiocenosis quantitative variables.

**Keywords:** acute alcoholic psychosis, liver dysfunction, microbiocenosis, regression model

Main characteristics of lipid and carbohydrate metabolism observed in young males with different SOMATOtypes OF Northeast Russia

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Our research was aimed at studying main parameters of lipid and carbohydrate metabolism in North­born young males, Europeans by origin, with different somatotypes. According to the examinee’s body type, we found 45 % of them sthenic, 29 % hypersthenic and 26 % asthenic. Blood biochemicals proved to range within the referent indices; however, the average lipid indices were close to the lower line of the norm. Of note that, those indices grew higher from asthenic subjects to hypersthenic ones. The most lipid disorders were observed in hypersthenic examinees while asthenic subjects demonstrated no deviation among the indices of lipid spectrum.
As for carbohydrate study, all the examinees showed their values close to the upper line of the normoglycemia. Of them, hypersthenic subjects were the highest in glucose.

**Keywords:** North, European population, body type, lipid and carbohydrate metabolism

THe POPULATIONS OF PERIPHERAL BLOOD LEUKOCYTES CARRYING ADHESION MOLECULES, IN PATIENTS WITH PSORIASIS

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Migration of leukocytes through the endothelium of microcirculature is regulated by adhesion molecules. Taking into account the important role of leukocytes migration processes into the skin of patients with psoriasis information about the concentration of adhesion molecules on neutrophils, monocytes and lymphocytes considering their morphological features has not only theoretical but also practical interest, because regulation of this process gives new possibilities for therapy. The study of leukocytes migration mechanisms is necessary for predicting the course of the disease and justifying the search for new effective methods of treatment. The purpose of this research was to investigate the migration of leukocytes carrying adhesion molecules from the peripheral blood to the skin in psoriasis and their role in the development of the pathological process. The clinical and immunological examination of 82 patients with vulgar and exudative psoriasis in the progressive and inpatient stage (39 women and 43 men) aged 20 to 60 years was carried out. Duration of the disease was from 3 months to 10 years. As a control group, 50 practically healthy people were examined (28 women and 22 men). Microscopic venous blood smear was carried out, the segmentogram of neutrophils, lymphocytograms, monocytes were analyzed and at the same time the content of leukocytes expressing receptors for adhesion molecules was determined. Under conditions of hyperproliferation of keratinocytes, as observed in psoriasis, a decrease in the number of neutrophils carrying L­selectin molecules, ICAM­1, LFA­1, LFA­3, PECAM­1 was registered. The level of lymphocytes with the molecules of ICAM­1, LFA­3 slightly increased, but a number of lymphocytes with molecules of L­selectin, LFA­1, PECAM­1 decreased. Changes in the level of monocytes carrying adhesion molecules were absent. The results of the statistical analysis allowed assessing the relationship of peripheral blood leukocytes carrying adhesion molecules, with their morphological characteristics in patients with psoriasis.

**Keywords:** leukocytes, adhesion molecules, psoriasis

REHABILITATION OF CHILDREN WITH RECURRENT BRONCHITIS USING
A NON­INVASIVE APPARATUS OF MICROWAVE EXPOSURE

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We presented our own data on use effectiveness of electromagnetic radiation (EMR) of centimetric band of not thermal intensity in children rehabilitation with recurrent bronchitis (RB), generated by means of the device “Aster”. 101 children aged from 1 year up to 6 years, including 60 boys (59.4 %) and 41 girls (40.6 %) were examined. EMR influence on the parameters of innate immunity and cytokine regulation was assessed. The level of IL­1β, IL­4, IL­6, IL­8 was determined in blood serum by method of an enzyme immunoassay by means of ООО “Cytokin” test systems. Immune status disturbances were revealed, which were characterized by a decrease in phagocytosis (PF) percentage ­ PF average value was (48.9 ± 2.8) % in children of group 1, (51.6 ± 2.7) % in control group 2, activation of oxygen­dependent killing mechanisms (NST­test spontaneous ­ (46.3 ± 4.6) units in group 1 and (47.9 ± 6.7) in group 2, NST test induced ­ (77.7 ± 4.9) in group 1 and in group 2 (73.7 ± 3.9) standard units). The data obtained are typical for a region with environmental problems, which corresponds to earlier research work in the Astrakhan region. The conducted studies showed that rehabilitation programs using EMR, increase the effectiveness of activities conducted in children with the recurrent bronchitis, reduce the average duration of bronchial obstruction from (6.3 ± 0.4) days to (4.4 ± 0.2) days, p = 0,005.

**Keywords:** recurrent bronchitis, children, rehabilitation, electromagnetic radiation, immunity

USE OF GEOMETRIC METHODS OF ANALYSIS OF VIDEO­OCULOGRAPHIC DATA
TO ASSESS THE FUNCTIONAL CONDITION OF A PERSON

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*Objective*. In article describes two original algorithms for the analysis of video­oculographic data and analyses the effectiveness of these algorithms to assess the current functional condition of a person. One of the algorithms is designed for estimating macrosaccades curvature and the other ­ to evaluate the smoothness of target tracking. Both algorithms are based on geometric methods of videooculographic data processing. *Methods*. The assess of the algorithms effectiveness was realized on the model of alcohol intoxication (used the medium doses of alcohol ­ 0.8 g of 96 % alcohol per 1 kg of body weight). For the simulation of saccadic movements and smooth tracking we developed two psychomotor tests, which were evaluated by two key indicators: the curvature of microsaccade and smooth target tracking. *Results*. The results showed that the operator’s activity disorders were usually accompanied by disturbance of the smooth oculomotor tracking. However the significant changes in the curvature of macrosaccades were not observed. *Conclusions*. Indicators of the smooth oculomotor tracking turned out to be quite informative for assessing the functional state of a person during the activity and can be used for practical diagnosis. Indicators of curvature of microsaccade were not sufficiently sensitive to the negative external factors and can’t be used for practical diagnosis of the current condition of the person.

**Keywords:** videooculography, the trajectory of gaze, saccade, fixation, alcohol, functional status, visual perception, smooth tracking