THE ROLE OF HYDROBIONTS AND BACTERIAL BIOFILMS IN SURVIVABILITY
OF SAPROZOONOSES IN THE MARINE ECOSYSTEM (Literature Review)

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This review presented the problem of saprozoonoses survivability in the marine environment. It is shown that hydrobionts is one of the major infection transmission factors. But the marine environment is unfavorable for existence of pathogenic bacteria; therefore, one of the important issues is mechanisms disclosure allowing to explain the continued existence of pathogenic bacteria in the marine environment. Experimental studies on aquatic organisms, reflecting the coping mechanisms of pathogenic bacteria in the marine environment have been discussed. Information concerning processes of marine bacteria biofilm formation has been stated . It is shown that biofilms can be formed by bacteria of one type or form a community of developing from many species of microorganisms, such as bacteria, protozoa, fungi or algae. It is noted that in the natural habitats biofilms can cause serious environmental deterioration, since they are difficult to destroy. The literature review showed that the pathogenic bacteria survivability in the marine environment is possible due to development of a wide range of different hosts (microalgae, plants, mollusks, protozoans, crustaceans, etc.), as well as due to the formation of biofilms as mono­ and mixed options on various surfaces, contributing to the preservation of their viability.

**Keywords:** saprozoonozy, hydrobionts, biofilm

DIOXINS IN THE ENVIRONMENT AND THE BODY OF ANIMALS NEAR LANDFILL:
TO THE METHODOLOGY OF PUBLIC HEALTH RISK EVALUATION

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For the first time dioxins (including 2,3,7,8­tetrachlorodibenzo­p­dioxin, TCDD) were revealed by high resolution chromatography­mass spectrometry in tissues of animals (rodents and fish) and abiotic samples (soil, sediment, snow) from the biotopes near the landfill with solid wastes (“Salariyevo”, New Moscow). Profiles of congeners in soil samples, snow and sediment were well comparable. Parameters of “toxic equivalency quantity” (WHO­TEQ98) greatly exceeded the levels registered in Vietnam dioxin­contaminated areas (territories of ecocide) known to produce a so­called dioxin pathology among population. As to the MPC for soil the observed levels near landfill were almost 38 times higher than the standards set in Russia. The consequences of the pollutants influence on the state of animals reflected the manifestations of toxic effects on the whole organism and the chromosome apparatus, in correlations with the parameters of dioxins (WHO­TEQ98) and/or TCDD in their tissues and objects in their natural habitat. Changes of cytogenetic status of fish and rodents, morphometric parameters of fish age dynamics, the emergence of individuals with abnormal head structure ­ correspond to pathological processes and conditions that determine the pathogenesis of human dioxin pathology. Analysis of the data obtained illustrates the possibility of creating a universal methodical approach for screening the hazards of dioxins’ low dozes for human health.

**Keywords:** human and animal ecology, morphogenesis, cytogenetic analysis, ecotoxicology, dioxins, TCDD

INTAKE ASSESSMENT OF SMALL DOSES OF MERCURY
IN THE HUMAN BODY WITH FOOD

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The aim of this work was to assess mercury content in food products and intake in the human body in Russia. Sampling was carried out on the territory of Russia without reference to the manufacturer in accordance with the principle of random sampling. The analysis of mercury concentrations in a wide range of food and agricultural products was carried out by atomic absorption with “cold vapor”. On the basis of this analysis we identified foods with the highest and lowest concentrations of mercury. According to the literature data a number of food products consumable by people with different income levels and at an average for the regions of Russia has been estimated. Daily intake of mercury in the human body according to this regiment has been calculated. A comparison of the actual mercury intake in the human body with safety daily dose has been made according to the FAO and WHO. Mercury dose intaking in the human body with fish and fish products has been also calculated. It is shown that the mercury intake in the human body with food products ranges within acceptance limits in Russia. However, there is a low­dose mercury intake typical for the entire population of Russia.

**Keywords:** mercury, food products, regiment, the human body, intake

HUMAN MORBIDITY IN THE CONDITIONS
OF NATURAL GEOCHEMICAL ANOMALY THAT CAUSES NO ENDEMIC DISEASES

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Geochemical and medical ecology studies were conducted in the areas of natural geochemical anomalies with excessive content of heavy metals (Ni, Cr, Co, Cu, Pb) in the Sverdlovsk region (the Middle Urals). The purpose of the work was to study the human morbidity rate in the natural geochemical anomalies (biogeochemical province), which, along with abnormally high content of heavy metals in the soil did not cause endemic diseases. Morbidity data were analyzed by generalized linear model device. The interpretable variable is arcsine­converted value of the cases number ratio to the study area population size. In the course of morbidity average data analysis covering five­year period it’s statistically significant increase was stated on the territory of the natural geochemical anomaly (p < 0.001) in comparison with full tone. The main contribution to the morbidity rate increase in the geochemical anomaly make infectious and parasitic diseases, diseases of the circulatory system, respiratory, digestive. As s reason for the increase of morbidity rate is proposed the weakening of immunity under the influence of high concentrations of the chemical elements. Fixed non­specific effect of the natural geochemical factor is probably universal for abnormal areas of the earth’s surface, characterized by the endemia absence.

**Keywords:** geochemical anomaly, biogeochemical province, morbidity, heavy metals

MORPHOMETRIC PARAMETERS AND PROPETIES OF ERYTHROCYTE MEMBRANE UNDER THE INFLUENCE OF EXTREME PROFESSIONAL FACTORS

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240 hot papas (age 25­47 years) took part in the research. They were divided into three groups depending on the length of service: 1­6, 7­15, 16­25 years. Red blood cells parameters were examined by means of the blood analyzer "Micros­60 OT", membrane deformability and osmotic fragility were determined according to special techniques at the beginning and at the end of the daily shift. The morphometric parameters of hot papas’ erythrocytes corresponded to normal values. The workload during the day did not lead to their significant shifts except anisocytosis in the group with work experience of 16­25 years. The influence of service duration on increase of red blood cell heterogeneity, a reduction in their total number and Hb level was found in the same group. At the beginning of the shift the membrane deformability and osmotic fragility in 0.45 % NaCl solution were significantly lower in all surveyed groups than in the control group. The average values ​​of these parameters increased in all groups by end of the shift. However, the control group values ​​were not achieved.

**Keywords:** erythrocyte morphometric parameters, membrane deformability, osmotic fragility, hot papas, extreme working conditions

ROLE OF POLYMORPHIC VARIANTS OF THE GENES TNFA, TSLP
IN THE OCCUPATIONAL ASTHMA DEVELOPMENT

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The aim of the study was to find possible associations of polymorphic variants rs1800629 of gene TNFA and rs1837253 of gene TSLP with the development of occupational asthma. The analysis of polymorphism of cytokine genes was carried out by means of polymerase chain reaction of DNA synthesis in 83 patients and 195 control subjects. Genomic DNA was isolated from whole blood samples using standard phenol/chloroform extraction techniques. Statistical analysis was performed using χ2 test as amended by Yeats and odds ratios with 95 % confidence intervals. As a result, it found that in patients with occupational asthma allele C and genotype CC polymorphic locus rs1837253 TSLP gene occurs more frequently (OR = 1.91, 95 % CI 1.11­3.28; p = 0,026 и OR = 2.48, 95 % CI 1.29­4.77; p = 0.010 respectively) than in the control group. The analysis of the association of polymorphic locus rs1800629 TNFA gene with occupational asthma did not reveal statistically significant results. The received data suggest the possible involvement of rs1837253 polymorphism TSLP gene in the formation of occupational asthma.

**Keywords:** occupational asthma, risk, gene polymorphism

THE LONGITUDINAL STUDY RESULTS OF THE PHYSIOLOGICAL STATUS
OF MALE NORTHERNERS – PARTICIPANTS OF THE PROJECT “MARS­500”

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We studied physiological status and somatic health of 23 male volunteers (age 24­50 yrs) recruited as a “northern” control group for the experiment “Mars­500”. The study was performed using standardized methods, established by the Institute of Medical and Biological Problems of the RAS, using hardware and software complex “Ecosan­2007”. Repetitive experiments were carried out in 6 years. Collected data were processed using Biostat and Statistica statistical software. In the course of the study we found certain features in the physiological status and the somatic health of the participants related to their inhabitation in the North. We discovered that our volunteers had decreased somatic health levels according to the Apanasenko scale. Analyzing the heart rate variability in our subjects we observed tension in regulatory systems and a domination of the central regulation circuit over the autonomous circuit. Additionally our subjects showed a deterioration of the hemodynamics regulation under a physical load. After 6 years we observed statistically significant increases in the body mass, the heart rate after physical load, biological age, and significant decrease of the physical health, which indicate the accelerated ageing in the group of surveyed. A number of persons with premorbid status have increased, indicating the increased tension of the regulatory systems and the decrease in the adaptability potential.

**Keywords:** men, North, “Mars­500” project, physiological status, somatic health

THE ADAPTIVE IMMUNE STATUS IN REPRESENTATIVES OF VARIOUS SOCIAL
AND PROFESSIONAL GROUPS OF INHABITANTS OF THE EUROPEAN NORTH
OF THE RUSSIAN FEDERATION

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The analysis of the immune status with definition of cellular immunity (CD3+, CD4+, CD5+, CD8+, CD16+, CD95+, HLA­DR+) and fagotsitarny activity has been carried out in 356 men at the age of 20­40 years of the different social and professional groups (leading a nomadic, settled life in the tundra; working on a rotational basis in the North Sea (16 and 256 days); office employees of the Solombala pulp and paper mill (PPM) not occupied in harmful production; office workers of the megalopolis Moscow). It has been revealed that the most frequent defect of immune protection was a low level of active phagocytes and deficiency of maintenance of mature T­lymphocytes in peripheral blood among nomadic inhabitants of the Arctic and persons working short watch in the North Sea. It has been proved that under the influence of extreme social and professional or ecologo­climatic factors in men of 20­40 years increase of neutrophiles, sells ­activators of B­lymphocytes (HLA­DR+) was registered that testifieed to tension of a humoral component of adaptive immune system. It has been stated that in the conditions of impact on a human body with a complex of various adverse factors of changing environment in all surveyed the same reaction of increase in levels of the cellular cytotoxicity (CD8+, CD16+) associated with deficiency of phagocytic protection developed that reduced spare capacities of regulation with risk of formation of T­lymphocytes functional insufficiency and development of secondary ecologically dependent immune imbalances.

**Keywords:** Adaptive immune system, extreme professional conditions, rotation based work, nomadic, settled way of life, the North

DYNAMICS OF EPIDEMIOLOGICAL PARAMETERS OF TYPE 1 DIABETES MELLITUS
IN CHILDREN IN THE REPUBLIC OF KARELIA

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Type 1 diabetes mellitus is one of the most common autoimmune diseases in the world. The Republic of Karelia belongs to a group of regions with a high prevalence rate of type 1 diabetes mellitus (over 200 per 100,000 residents). In the last 20 years, type 1 diabetes incidence has increased 3.4 times, mostly due to the onset at an early age. The incidence rate of new cases of type 1 diabetes among children and adolescents does not show any clear linear dependence. Significant incidence occur every 4 or 5 years, which is most likely to be connected with an increase in the incidence of virus infection in these years. The primary incidence of type 1 diabetes mellitus among children per every 100 thousand of the child population is also higher in the Republic of Karelia compared to the Russian Federation. 17,4% children in Karelia have a genetic predisposition to type 1 diabetes mellitus (positive for HLA­DQB\*0302 and/or \*02 and negative for the protective alleles \*0602/03, \*0301), which is lower than in Finland (23%).Genetic heterogeneity among ethnic populations in conjunction with environmental factors can determine the peculiarities of type 1 diabetes mellitus prevalence rate.

**Key words:** type 1 diabetes, epidemiology, disease, children and adolescents

PREVALENCE OF COMPLICATIONS OF TYPE 2 DIABETES MELLITUS
AND RELATED DISEASES IN 2012­2016 IN ALMATY, KAZAKHSTAN

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We analyzed the prevalence of complications of type 2 diabetes mellitus and concomitant diseases in Almaty, Kazakhstan for the period 2012­2016. Statistically significant trends in the prevalence of nephropathy (from 4.0 to 2.2 per 10 000 population), retinopathy (from 12.7 to 7.5 per 10 000 population) and sensory neuropathy (from 14.0 to 10.1 per 10 000 population) were revealed, as well as trends in the reduction in the prevalence of angina pectoris, myocardial infarction, cerebrovascular diseases among type 2 diabetes patients. Downward trends in the incidence of disability due to myocardial infarction, cerebral circulation disorders, vision loss and nephropathy were observed as well. Districts of the Almaty city with the most unfavorable epidemiological situation in relation to complications of type 2 diabetes mellitus were identified. There was no association between the number of internal medicine specialists or endocrinologists and the prevalence of complications of type 2 diabetes in the city.

**Keywords:** type 2 diabetes mellitus, complications, concomitant diseases, disability, Almaty, Kazakhstan