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MONOGRAPHY

**PHYSICAL AND CHEMICAL FACTORS LEADING TO THE
DEVELOPMENT OF ENVIRONMENT-RELATED
IMMUNOSUPPRESSIVE SYNDROME AND THE REHABILITATION**

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Monography «**PHYSICAL AND CHEMICAL FACTORS LEADING TO THE
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The Monography formate basic knowledge about toxicology effect by lead. Lead toxicity is an important environmental disease and its effects on the human body are devastating. There is almost no function in the human body which is not affected by lead toxicity. Though in countries like US and Canada the use of lead has been controlled up to a certain extent, it is still used vehemently in the developing countries. This is primarily because lead bears unique physical and chemical properties that make it suitable for a large number of applications for which humans have exploited its benefits from historical times and thus it has become a common environmental pollutant. Lead is highly persistent in the environment and because of its continuous use its levels rise in almost every country, posing serious threats. This article reviews the works listed in the literature with recent updates regarding the toxicity of lead. Focus is also on toxic effects of lead on the renal, reproductive and nervous system. Finally the techniques available for treating lead toxicity are presented with some recent updates.

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DEFINITIONS

Hygienic regulation-the establishment of legally harmless (safe) for human environmental factors: the maximum permissible concentrations (MPC) of chemicals, the maximum permissible levels of exposure (PL) of physical factors, etc.

Immunosuppressive state - inhibition of the immune system as a result of diseases, intoxication, the use of certain drugs (corticosteroid hormones, cytostatics), exposure to ionizing radiation, stress situations. It is characterized by various disorders in the system of cellular and humoral immunity, as well as a decrease in the functional activity of immune cells.

Immunomodulators-natural or synthetic substances that can have a regulatory effect on the immune system. By the nature of their effect on the immune system they are divided into immunostimulatory and immunosuppressive.

Immunostimulants-substances that stimulate nonspecific resistance of the body (NRB) and immunity (humoral and cellular immune reactions).

Maximum permissible concentration (MPC) — approved by law sanitary and hygienic standard. MPC is understood to be the maximum concentration of chemical elements and their compounds in the environment, which, under daily influence for a long time on the human body does not cause pathological changes or diseases established by modern methods of research in any period of life of the present and subsequent generations.

The maximum permissible level (MPL) — legislation approved by the upper bound magnitude level factors, the effects of which on the organism intermittently or during the entire life there is no disease process or changes in the health status detectable by modern methods at once or in the remote terms of life of present and future generations.

Intoxication is a condition that occurs after the introduction of a toxic substance and leads to a violation of physiological functions and reactions. Share acute and chronic intoxication.

Environment-related secondary immunodeficiency (ERSID) — immunity disorders caused by exposure to environmental factors such as ionizing radiation, waste oil refining industry, cytotoxic waste from industry, etc. With secondary immunological insufficiency, T -, B-systems of immunity, as well as factors of natural resistance (phagocytosis, complement, interferons, etc.) can be affected, their combined damage is possible, which leads to a decrease in the protective functions of the immune system, a violation of regulatory relations between the immune systems.

Pharmacological screening (from the English. screening-selection, sorting) - a strategy of scientific research aimed at identifying pharmacological activity in a number of substances.

AIAT	— alanine aminotransferase
AO	— antioxidants
AsAT	— aspartate aminotransferase
BAS	— biologically active food Supplement
Ch	— cholesterol
CL	— common lipids
CRPA	— conditional reflex of passive avoidance
ECG	— electrocardiogram
EI	environmental immunology
ERSID	Environment-related secondary immunodeficiency
GIT	— gastrointestinal tract
GLP	— «Good Laboratory Practice»
HR	— heart rate
IRI	- immunoregulatory index
F	— female
LD ₅₀	— average lethal dose
M	— male
MDA	— malonic dialdehyde
mg/kg	- milligram on kilogram
MR	— mass ratio
NAD	— nicotinamide adenine dinucleotide
NADF	— nicotinamide adenine dinucleotide phosphate
NBT	— nitro blue of tetrazole
NEFA	— non-esterified fatty acids
NCC	- nuclea contain cells
MPC	maximum permissible concentration
i/g	— intragastric
WPI	water pollution index
TB	— total bilirubin

INTRODUCTION

Currently, the subject of attention of researchers are various aspects of the environmental relationships of modern man with environmental factors. About 20 chronic diseases are considered to be the result of chronic intoxication of the body by various xenobiotics (Minimat's disease, Itai – Itai disease, etc.). In addition, the results of clinical and experimental studies show that the impact on the human body of the production factors of different physico – chemical nature leads to the development of environment-related secondary immunodeficiency (ERSID). Immune system dysfunction and the development of ERSID is the result of the breakdown of adaptive mechanisms of the body. According to experts of WHO, immunodeficiency is one of the most important reasons for reducing human life expectancy, since the onset of all diseases is associated with a violation of the immune system functions.

Immunodeficiency leads to the development of bacterial, viral, parasitic, chronic inflammatory, cancer and other diseases. Also, modern research data show that immunodeficiency conditions lead to premature aging, atherosclerosis with complications (myocardial infarction, cerebral circulation disorders, etc.), diabetes, aggravation of pathological infectious processes, the development of autoimmune diseases, etc.(1, 2). It is known, that the immune system is responsible for maintaining the genetic integrity and constancy of the internal environment of the body. It is the functional activity of the thymus gland from the second week of intrauterine development that causes the genetic identity of the functional cells of the body and protection from mutational development defects (3, 4, 5).

Kazakhstan is a huge territory and rich in natural resources unique state, where many industries of industrial industry and agricultural production are concentrated. In the years of the Soviet Union, the region was used as a military space ground. The subsoil was developed irrationally, by extensive method, which already at that time contributed to the formation of ecologically vulnerable zones in the territory of the Republic. After Kazakhstan gained economic and political sovereignty, the accelerated industrial development of its natural resources, including new deposits

that are located near settlements, is now mainly by foreign investors. As a result, there are uncontrolled industrial emissions into the environment, which extend to large areas, going beyond the sanitary protection zones of industrial enterprises. In this regard, the country has developed an unfavorable, and in some areas – a crisis environmental situation. This situation is of reasonable concern on the part of the state bodies in the sphere of environmental protection, including the health system, and the population (6, 7, 8). It is well known that as a result of human economic activity in some regions of the Republic formed natural and man-made biogeochemical provinces: oil and gas, lead-zinc, arsenic, chromium, phosphorus, etc. this was facilitated by the lack of a unified environmental policy, the introduction of non-environmental technologies, ill-considered involvement in the economic turnover of water and land resources, miscalculations in the design of a number of industrial and environmental facilities, etc (9, 10, 11, 12).

Environmental hazards include lead, cadmium, mercury, oil, zinc compounds exceeding the maximum allowable concentration (13, 14, 15, 16). Lead by the degree of toxic effects on humans belongs to the highest, the first class of danger (17,18). For the urbanized metropolis of Almaty, up to 90% of lead emissions are associated with the use of leaded gasoline as a motor fuel. City dust contains more than 1% of this metal (19, 20, 21, 22, 23, 24). The most polluted rivers of Kazakhstan in excess of the maximum permissible concentration (MPC) for lead compounds are the Ural and Irtysh rivers, where indicators of water pollution index (WPI) were, respectively, 7, 18 and 6, 56 conventional units. On the Irtysh river, which is the main artery of Kazakhstan and supplying water to the three largest regions of the Republic: East-Kazakhstan, Pavlodar, Semipalatinsk, deployed more than 900 water users, non-ferrous metallurgy, chemical industry, machinery, petrochemical, food and other industries. The river is constantly polluted, first of all by lead compounds and water intake for the needs of the population is 4, 82 km³, which is 20% of the total volume in the Republic of