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GLOBALIZATION OF SCIENTIFIC KNOWLEDGE: INTERNATIONAL COOPERATION AND INTEGRATION OF SCIENCES

held on October 22th, 2021 by

NGO European Scientific Platform (Vinnytsia, Ukraine)
LLC International Centre Corporate Management (Vienna, Austria)



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EFFECTS OF ANTHROPOGENIC ENVIRONMENTAL POLLUTANTS ON HUMAN HEALTH

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Summary. *The article investigates the influence of anthropogenic environmental protections on human health.*

Keywords: *ecological situation, anthropogenic environmental pollutants.*

It has now been proven that an unfavorable ecological situation can be the direct cause of a violation of the state of human health, and not only at the level of individual health (health of individuals), but also at the population level. The influence of environmental chemical factors has been most studied in this regard – about 80 chemical elements are necessary to build certain components of their own cells, build hormones, enzymes, to maintain normal metabolism, etc.

A health disorder may be associated with a deficiency or excess of certain chemical elements in a given area. There are territories that are overly saturated with toxic elements: lead, thallium, uranium, etc. There are regions that are "deficient" for the necessary elements: iodine, iron, fluorine. Two thirds of the territory of our country lacks iodine, one third – fluorine and selenium. This can lead to the development of so-called endemic diseases.

The strength of the toxic effect of a chemical factor on the human body is determined by many components, for example, chemical structure, physicochemical properties of pollution, routes of entry into the body, ability to cumulation (accumulation), concentration, exposure time (exposure), etc.

Both in industrial settings and in everyday life, a person is rarely exposed to one substance. Most often, there is a combined effect on the body of two or more pollutants at the same time. There are three main types of combined action of chemicals on living organisms:

- synergism, when one substance enhances the action of another;
- summation (additive action), when the effect of substances is added;
- antagonism, when one substance weakens the action of another.

Xenobiotics, chemical substances alien to the body, are of great danger to the organism. They have a general toxic, irritant and sensitizing effect. For example, a high sensitivity of male gonads to benzene, organ chlorine compounds, manganese, chloroprene, caprolactam, lead has been established. Xenobiotics can have an embryo-tropic effect, which can lead to fetal death, organ rupture (deformity), toxicosis of pregnancy and miscarriages. [1]

Chemicals can be mutagens that cause changes in hereditary properties in offspring if the mutation invades the germ cells. The following mutagens are known:

- natural substances (nitrates, nitrites, heavy metals, alkaloids, hormones);
- processed natural compounds (products of oil refining, combustion of coal, wood), chemicals that do not occur in nature (pesticides, nitrosamines).

Some xenobiotics are carcinogenic. The carcinogenic effect depends on the dose, the time of exposure, the toxicity of the carcinogenic factor and can manifest itself after a long period – after 10-20 years. [2]

Consider the impact of some environmental pollutants on the human body:

Lead (Pb). When intoxication with lead, the nervous and hematopoietic systems are hit. Children are especially sensitive to lead poisoning. The human body contains on average ~ 120 mg of lead, which can be found in all tissues and organs, and primarily in the skeleton. It takes ten years for the lead accumulated in the bones to be reduced by only half.

Due to human economic activity, the migration of lead in the environment has acquired gigantic proportions. Up to 90 % of the total lead emissions are related to

gasoline combustion products with an admixture of lead compounds. The appearance of a significant amount of lead in the atmosphere, hydrosphere and lithosphere led to an increase in the accumulation of this metal in plant, animal, and human organisms. As a result of self-purification of the atmosphere, a significant part of the lead either settles near sources of pollution, or returns to the surface of land and oceans with precipitation.

City dust can contain up to 1 % lead. Its content in rain and snow ranges from 1.6 mcg/l in areas remote from industrial centers to 250-350 mcg/l in large cities.

Industrial wastewater is one of the main sources of this metal in the hydrosphere. In bottom algae, the concentration of lead due to the accumulation effect increases by 700 times, in phytoplankton – by 4000, in zooplankton – by 3000 and in mollusks – by 4000 times. [3]

The person who is one of the last links in the food chain is most at risk of the neurotoxin effects of lead. Lead compounds enter the human body through the skin, mucous membranes, respiratory tract and digestive tract.

With lead intoxication, brain damage (encephalopathy) develops, the respiratory function of the blood is impaired due to the destruction of erythrocytes, impotence may develop, dysfunction of the digestive tract as a result of atrophy of the mucous membrane of the small intestine and inhibition of a number of enzymes due to the displacement of zinc and copper from the latter by lead. The blood lead level does not return to normal even three years after the normalization of its level in the air. A relationship has been established between the levels of lead and cadmium in the hair of schoolchildren and the degree of their mental development.

Mercury (Hg). Mercury enters the body through respiration, through food, and through the skin. Organic mercury compounds are especially toxic: methylmercury [CH₃Hg]⁺, methylmercury and others. In the human body, mercury circulates in the blood, combining with proteins, and is partially deposited in the liver, kidneys, spleen, and brain tissues. Mercury compounds easily penetrate the fetus through the placenta and into breast milk and are therefore especially dangerous for infants.

Mercury is excreted from the body through the kidneys, intestines, sweat glands. It takes about 70 days for the amount of mercury accumulated in the body to be halved. A characteristic sign of mercury poisoning is the appearance of a blue-black border around the edges of the gums. During the sad outbreak of mass mercury poisoning from fish caught in Minamata Bay, Japan, the concentration of mercury in the water of the bay was 30,000 times higher than in the open ocean. The fish, which caused human poisoning, contained hundreds of times more methylmercury than the water in the bay where it was caught. To an even greater extent than in fish, mercury accumulates in oysters. [4]

The first mass mercury poisoning (called "Minamata disease") occurred in 1956, when 130 patients were registered, and the second also occurred in Japan (near the Agano River, in Niigata Prefecture) in 1964-1965, when 180 people, of whom 52 died. These poisonings were the result of direct pollution of the bay with sewage and other sources of industrial waste discharge from the nearby plants for the production of nitrogen fertilizers and the synthesis of vinyl chloride containing alkyl mercury compounds.

Diseases in the initial stages were expressed mainly by symptoms of damage to the central nervous system. At the same time, speech disorders, gait disturbances, hearing and vision impairments were noted. A higher (on average by 25 %) content of methylmercury in blood cells in newborns than in their mothers was found, which is explained by the higher sensitivity of the fetus to this poison. Some children born to sick mothers had various congenital deformities.

The daily maximum allowable dose of mercury for an adult is 0.05 mg, of which methylmercury should not exceed 0.03 mg.

Cadmium (Cd). Cadmium enters the environment through air and water during the extraction and industrial processing of raw materials, during the combustion of certain types of fuel, incineration of municipal waste, with wastewater, etc.

Cadmium has the ability to accumulate in living organisms during prolonged exposure to dust, as well as substances containing an increased amount of metal. It has been established that 50-60 mcg of cadmium enter the body of an adult in the United States per day, in Sweden – 15-20 mcg, and in Japan 80 mcg of cadmium. [5]

The influence of even small concentrations of cadmium can lead to serious diseases of the nervous system and bone tissue. Severe bone disease ("Itai-Itai Disease"), caused by chronic cadmium poisoning, was first noted in Japan in 1956, when wastewater from the Japanese concern Mitsui, containing cadmium, entered the irrigation system of nearby rice fields. Rice has caused them lethargy, pain in various parts of the body, kidney damage and softening of the bones.

Chromium (Cr). The toxicity of chromium and its carcinogenic effect depend on the valence of the metal: the most dangerous in this respect is hexavalent chromium. It irritates the mucous membranes of the upper respiratory tract, has a sensitizing effect, and is an allergen. In industries related to chromium, the incidence of cancer among workers is 30 times higher than among workers in other industries. [6] Chromium causes damage to the liver, kidneys, heart, allergies, cancer, mental disorders.

Conclusions. Humanity needs to realize that our planet is a kind of living organism that lives in accordance with certain principles, laws and norms of existence. Ignoring this provision, the spontaneous use of the resources of the inorganic world on a gigantic scale, and anthropogenic pollution of the natural environment have led to unpredictable serious violations of the laws of the biosphere, in particular the laws of the biotic cycle. Chemical, radioactive and bacteriological pollution of air, water, soil and food, as well as noise, vibration, electromagnetic fields and other physical pollution of the environment cause genetic changes and severe pathological phenomena in the human body. This leads to an increase in diseases, the birth of inferior children, premature aging and death.

References:

- [1] Левченко О. Г., Землянська О. В., Праховнік Н. А., Зацарний В. В. (2019) *Безпека життєдіяльності та цивільний захист*. Київ: Каравела.
- [2] ISBN 978-966-222-997-4.
- [3] Richard M. Fisher, Vikas Gupta. (2021). Heavy Metals. *NCBI Resources: Bookshelf*. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK557806/>.

- [4] Hanna-Attisha M, Lanphear B, Landrigan P. (2018). Lead Poisoning in the 21st Century: The Silent Epidemic Continues. *Am J Public Health*. 108(11), 14-30.
- [5] Yaginuma-Sakurai K, Murata K, Iwai-Shimada M, Nakai K, Kurokawa N, Tatsuta N, Satoh H. (2012) Hair-to-blood ratio and biological half-life of mercury: experimental study of methylmercury exposure through fish consumption in humans. *J Toxicol Sci*. 37(1), 123-130.
- [6] Chunhabundit R. (2016). Cadmium exposure and potential health risk from foods in contaminated area, Thailand. *Toxicol. Res*. 32 (1), 65–72.
- [7] Achmad R. T., Budiawan B., and Ibrahim Auerkari E. (2017). Effects of chromium on human body. *Annu. Res. Rev*. 13, 1–8.