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The modern approaches to studying of influence of heavy metals as environment factor on growth of malignant

In this article the main feature of action on people of carcinogenic agents is considered. These agents consist in large number of sources of their entry in environment and an organism of people, and complex combination of various factors. It creates certain difficulties on the track of a solution to the problem. The heavy metals played a significant part of environmental pollution. The understanding of processes of migration and transition of elements from one environment in another has great practical value for studying of mechanisms and ways of impact on a human body and estimation of level of toxicity of chemical elements.

Keywords: chemical elements, transformation, heavy metals, multiple-factor influence, migratory properties, adaptation, mutagen effect, carcinogenic properties.

Scientific problems of an environmental factors score on health of a human and justification of system of improving actions are priority problems of a state policy practically in all developed countries today. In this connection there is a need of advanced studying of a role of anthropogenic factors for formation of health of population. The situation is emerging in Kazakhstan causes complex multiple-factor impact of environment on population health that creates need to realize actions which are directed on concrete decision-making on control of condition of heavy metals in objects of environment in system « the environment — the human» [1].

Normal functioning of a human body is impossible without the optimum of microelements content. It is known, that as a part of an organism more than 60 elements contain in trace amount, and seven of them are obligate including manganese, zinc, copper. Their influence on physiological processes in an organism can be explained that microelements are a part so-called of «accessory substances» — respiratory pigments, vitamins, hormones, enzymes, and also the coenzymes participating in regulation of vital processes [2].

Microelements can be taken different components of soil, precipitate in form of insoluble salts. Possibilities of their transfer to an inactive condition aren't identical at different soils, distribution on a surface of soil is determined by many factors. It depends on features of pollutions sources, meteorological features of the region, geochemical factors, a landscape situation as a whole and other reasons [3]. Elements — toxicant polluting the soil, concentrate in upper layer (0–10 cm). It is established, that 57–74 % of lead and mercury at man-made injection of pollutants are fixed in a layer of 0–10 cm and only 3–8 % migrate up to the depth of 30–40 cm [4]. The important role in accumulation of heavy metals is played by complexes of secondary minerals with organic substance and iron and aluminum hydroxides. The great number of organic compounds is formed soluble or insoluble complexes with copper, in this connection ability of soils to connect copper or to contain it in the dissolved condition substantially depends on character and quantity of organic substance.

The significant role in increase of migratory properties of heavy metals is played by water-soluble organic compounds with which are connected 60–90 % of metals migrating in a soil profile. The understanding of migration processes and transition of elements from one environment in another has great practical value for studying of mechanisms and ways of impact on a human body, estimates of degree of toxicity of chemical elements. In accordance with observation, get in an organism of any one microelements in the increased concentration the contents and other microelements changes. The redistribution happening in the maintenance of microelements in organisms tissues during the earliest period of get of any microelements in increased or lowered concentration, has the adaptation and protective character directed on ensuring the best work of tissues and organs under changing conditions. In case of any microelements injected in an organism in concentration which exceed the adaptation potential necessary for normal activity of an organism, the equalized relations between microelements are broken and get out of control physiological regulation, and pathogenic action of this microelements starts being shown. Recently ecological conditionality about 20 diseases which were taking place among the population, including oncology [5] is established.

The highest carcinogenic risks have cadmium, arsenic, nickel, chrome. The carcinogenic action capacity of metals is characterized in the following way: arsenic > chrome > nickel > beryllium > lead > cadmium > mercury.

Under the influence of metals the different types of chromosomal aberration are induced. At the persons living in areas with intensive pollution by heavy metals: aluminum, nickel, chrome, etc., find changes in chromosomes of somatic cells. Mutagenic activity of some metals is shown on prevailing impact on genetic structures, and others — on metabolic derangements in cells. Heavy metals, passing placental barrier of pregnant women, get into an organism of a child and promote emergence of defective generation.

Excess concentration of metals can cause serious deranged biosynthesis and metabolic derangements that promotes decrease in nonspecific resistance of an organism, leads to disorders of the allergic and somatic status, and consequently, and to disorder of functions of various organs and systems.

There are information that derangements of balance of lead in an organism can prognosticate the tumor growth of cells. Excess of copper leads to hemodyscrasia, provokes development of anemia with liver regeneration. With dysbolism of copper in an organism connect early stages of development of malignant neoplasms. Zinc doesn't have specific toxic properties, however when it get in an organism in significant amounts causes gastric indigestion. Inorganic compounds of cadmium at chronic inhalation and oral introduction in an organism, along with the all-toxic are caused also by gonad- and embryotoxic actions. Manganese belongs to neurotropic metals, causes a hyperplasia of a thyroid gland. There are information of mutagenic effect of manganese, and also gonadotoxic action. Pathological processes in an organism caused by intake of manganese, is connected with of its' metabolism. At the end of the 80th years of XX century in experiments on animals transplacental carcinogenic action is shown for more than 60 substances and their combination, relating to various classes, including metals compounds, such as cobalt, zinc, magnesium, lead [6].

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Ауыр металдардың әсерінен қауіпті жасөсінділердің көбеюін қоршаған орта факторлары ретінде жаңа тұрғыдан зерттеу

Мақалада қоршаған орта мен адам ағзасына канцерогенді агенттердің түсу жолдарының көптігіне, әр түрлі факторлардың күрделі тіркестігіне байланысты олардың адамға әсерінің негізгі ерекшелігі қарастырылған. Осыған байланысты берілген мәселені шешу жолындағы негізгі қиындықтар туындайды. Қоршаған ортаның ластануындағы басты рөлді ойнайтын ауыр металдар. Адам ағзасына әсер ету жолдары мен механизмін оқып-білуге элементтердің бір ортадан екіншіге ауысу және миграциялау үдерістерін түсінудің, химиялық элементтердің токсикалық дәрежесін бағалаудың практикалық маңызы зор.

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Современные подходы к изучению воздействия тяжелых металлов как фактора окружающей среды на рост злокачественных новообразований

В статье рассмотрены особенности действия канцерогенных агентов на организм человека. Отмечено, что одними из основных загрязнителей окружающей среды являются тяжелые металлы. Сделан вывод, что понимание процессов миграции и перехода тяжелых металлов из одной среды в другую имеет большое практическое значение для изучения механизмов и путей воздействия на организм человека, оценки степени токсичности химических элементов.

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