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### **Some aspects of study of influence of heavy metals as unfavorable factor of environment**

Environmental contamination by heavy metals — copper, zinc, chromium, lead, mercury, cadmium, etc. formed by emissions into the environment by industry. Found that most of the metal is deposited in the range of 1–2 km from the emission sources, and 10–40 % — in the range of 8–10 km from the enterprises. Precipitation adequately reflects the air pollution in towns. As part of the snow, as in the accumulative indicators reflecting specific anthropogenic load of industrial zones. Important role in the accumulation of heavy metal complexes play a secondary minerals with organic matter and hydroxides of iron and aluminum. Major role in increasing migration properties of heavy metals play water-soluble organic compound, which is associated with 60–90 % of migratory environmental metals. Understanding the processes of migration and transition elements from one environment to another is of great practical importance for the study of the mechanisms and pathways to human exposure, assess the degree of toxicity of the chemical elements.

*Key words:* chemical elements, heavy metals, chromosomal aberrations, carcinogenic effect, environment, concentration.

Scientific problems of estimation of influence of factors of environment on the health of man and ground of the system of health measures today are the priority tasks of public policy practically in the entire developed countries. In this connection, there is a necessity of deep study of role of anthropogenic factors of environment for forming of health of population. Position that was folded in Kazakhstan stipulates the complex multivariable affecting of environment health of population that creates a necessity to carry out actions that is sent to the acceptance of concrete decisions on control after the state of heavy metals in the objects of environment in the system «A habitat is a man» [1, 2].

The normal functioning of organism of man is impossible without optimal maintenance in him microelements. It is known that in composition an organism there are more than 60 elements in micro numbers, from them obligating 7 are considered, including manganese, zinc, and copper. Their influence on physiological processes in an organism it is possible to explain that microelements enter in the complement of the so-called «accessory substances» — respiratory pigments, vitamins, hormones, enzymes, and conferment participating in adjusting of vital processes [3–5].

The primary and basic sources of microelements soils and natural waters serve as for living organisms. At one time V.I.Vernadskii paid attention to that composition of soil is in close connection with composition of other parts of biosphere. Rotation of elements in the system of atmosphere-natural has water-soil-plant-animal organisms territorial conformity to law, that the presence of hearths can violate with enhanceable maintenance of microelements [6].

Microelements can exchange or non-exchange taken by the different components of soil, to fall out as insoluble salts. Possibilities of translation of them in the not mobile state are different at different soils, distribution on the surface of soil is determined by many factors. It depends on the features of sources of contamination, meteorological features of region, geochemical factors, landscape situation on the whole and other reasons [7]. Elements — toxicants contaminating soil is concentrated in (0–10 cm) alayer. It is set that 57–74 % leads and Mercury at anthropogenic contamination are fastened in a layer a 0–10 cm and only 3–8 % migrate to the depth a 30–40 cm [8].

An important role the accumulation of heavy metals is played by the complexes of secondary minerals with an organic substance and hydroxides of iron and aluminum. The great number of organic compounds is formed by soluble or insoluble complexes with a copper, in this connection ability of soils to link a copper or contain it in a cut-in kind largely depends on character and amount of organic substance. Organic components sorb zinc and bind it in steady forms; as a result, there is an accumulation last in superficial horizons. A large role the increase of migratory properties of heavy metals is played by water-soluble organic compounds to that 60–90 % migrant in a soil profile metals are related.

Understanding of processes of migration and transition of elements from one environment in other has a large practical value for the study of mechanisms and affecting ways organism of man, estimation of degree

of toxins' of chemical elements. On supervisions, at entering organism of someone microelement in enhanceable concentrations maintenance changes and other microelements. A redistribution what be going on in maintenance of microelements in the tissues of organism in a most early period of receipt of some microelement in enhanceable or lowered concentrations carries the adaptation and protective character sent to providing of the best work of tissues and organs at changing terms. In case that some microelement enters organism in concentrations, that excel adaptation possibilities necessary for normal activity of organism, equilibrated relations between microelements are violated and get out of hand of the physiological adjusting, and the morbidic action of this microelement begins to show up. An ecological conditionality is lately set approximately 20 diseases, taking place among a population, including oncology [9].

Most high carcinogenic risk is possessed by a cadmium, arsenic, nickel, chrome. The capacity of metals for a carcinogenic action is characterized as follows: arsenic > chrome > nickel > beryllium > lead > cadmium > mercury.

Under act of metals, the different types of chromosomal aberrations are induced. At persons resident in districts with intensive contamination heavy metals: by an aluminum, nickel, lame to and other, changes were marked in the chromosomes of somatic mews. The mutagen action of one metals shows up on the predominating affecting genetic structures, and other — on violation of metabolic situation in mews. Heavy metals, passing the placenta barrier of expectant mothers, get to the organism of fruit and assist appearance of inferior posterity.

At the transplacental action of chemical, in particular, blastogenous agents, for an embryo there can be violations that depend on character of connection, doses, terms and period of influence. So, at affecting of blastogenous agent 1–6th week after an impregnation (period of division of zygote, implantation, organogenesis, placentation) a embryotoxic effect resulting in death of embryo and spontaneous abortion will be realized, with 2th for a 8th week (organogenesis) — teratogen effect as teratosiss of embryo (periods of placentation, histogenesis, organogenesis and height of fruit) is a carcinogenic effect — there are malignant new formations.

The overconcentration of metals can cause serious changes in metabolism and disorganization of metabolic processes, that assists the decline of heterospecific resistance of organism, results in violation of allergic and somatic status, and consequently, and to violation of functions of different organs and systems.

Under act of metals the process of hematopoietic is damaged, that in turn conduces to growth of the immunodeficient state in an organism. Under the action of toxic metals the cardiovascular suffer in one or another degree, secretory, digestive, endocrine, immune, hematogenesis systems. However, at all polymorphism picture of toxic influence, for every metal the most defeat of one of the afore-named systems is characteristic.

There is information, that violation of balance of lead in an organism can forecast a tumor cell growth. Surplus of copper results in violation of hematogenesis, provokes development of anemia's with the regeneration of liver. With violation of exchange of copper in an organism, link the early stages of development of malignant tumors.

Zinc does not possess specific toxic properties, however at a hit in fars into an organism causes dyspeptic disorders. Inorganic connections of cadmium at the protracted inhalation and per oral entering organism, along with general toxic gonadal — and causes anembryotoxic effect. A manganese behaves to the neurophilic metals, causes hyperplasia of thyroid.

There is information about the mutagene effect of manganese, and also gonadotoxic action. Pathological processes in an organism are conditioned by the receipt of manganese, related to metabolism last. By the end of 80th in experiments on animals a transplacental carcinogenic action is shown more than 60 substances and their combination, related to the different classes, including connections of metals, such as a cobalt, zinc, magnesium, lead [10].

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### Ауыр металдардың әсерін зерттеудің кейбір қырлары қоршаған ортаның жағымсыз факторы ретінде

Қоршаған ортаның ауыр металдармен — мыс, мырыш, хром, қорғасын, сынап, кадмиймен және тағы басқалармен ластануы өнеркәсіпорындарының қалыптасуынан болады. Металдардың көп бөлігі 1–2 км-дегі шығару қорынан, ал 10–40 %-ы 8–10 км кәсіпорыннан екені белгілі. Елді мекеннің жағдайын атмосфералық жауын-шашын мен ауаның ластануы белгілейді. Кәсіпорын аймақтарындағы қар құрамында аккумулятивті индикатор тәрізді спецификалық антропогендік қысым болады. Ауыр металдардың жинақталуында екіншілік минералдар мен органикалық заттар кешендері, алюминий мен темір маңызды рөл атқарады. Ауыр металдардың миграциялық ерекшелігі суда еритін органикалық заттармен бірігіп, қоршаған ортаның 60–90 % металдарымен байланысып маңызды рөл атқарады. Элементтердің бір ортадан келесі ортаға көшу мен ауысу процесі адам ағзасының ішкі құрылысына әсер ету жолдарын, химикалық элементтердің улағыштық деңгейін білуде үлкен тәжірибелік мәнге ие болады.

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### Некоторые аспекты изучения воздействия тяжелых металлов как неблагоприятного фактора окружающей среды

Загрязнение окружающей среды тяжелыми металлами — медью, цинком, хромом, свинцом, ртутью, кадмием и другими формируется за счет выбросов в окружающую среду промышленными предприятиями. Установлено, что большая часть металлов осаждается в пределах 1–2 км от источников выбросов, а 10–40 % — в пределах 8–10 км от предприятий. Атмосферные осадки адекватно отражают загрязнение воздуха в населенных пунктах. В составе снега, как в аккумулятивном индикаторе, отражается специфическая антропогенная нагрузка промышленных зон. Важную роль в накоплении тяжелых металлов играют комплексы вторичных минералов с органическим веществом и гидроокислами железа и алюминия. Большую роль в повышении миграционных свойств тяжелых металлов играют водорастворимые органические соединения, с которыми связано 60–90 % мигрирующих в окружающей среде металлов. Понимание процессов миграции и перехода элементов 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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