

Materials of the Conferences

**BIOACCUMULATION OF
CANCEROGENES IN FABRICS OF THE
EXHIBITED POPULATION OF THE
CENTER OF FERROUS METALLURGY**

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According to numerous sources of the literature as the major addition to an estimation of an exposition on the basis of monitoring pollution of an inhabitancy comparative results of an estimation of accumulation, including metals can serve, in the internal environment of an organism at inhabitants of compared territories or separate groups of the population as microelement structure of bioenvironments (blood, urine, hair, nails, a teeth, etc.) reflects total receipt of polluting substances from objects of an environment and is an objective parameter of ecological trouble (B.A.Revich, 1997, 2001; L.I.Privalova, B.A.Katsnelson, S.V.Kuzmin, etc., 2003; V.M.Boev., 2005; B. Seifert, K. Becke., K. Hoffmann et.al., 2000).

Research wet inhabitants of Magnitogorsk of different age groups has shown, that high concentration of cadmium and nickel are characteristic for all age groups with the maximal parameters exceeding an allowable level in 6,0 times ($p < 0,02$) and 3,9 times ($p < 0,02$) at persons of 20-25 years and 5-years age, accordingly. Guard high concentration beryllium in urine, 20-25 years exceeding an allowable level in 2,4 times, ($p < 0,05$), that less than his minimum level of 4-years age in 8,7 times ($p < 0,02$).

The maintenance of lead in age group of 20-25 years exceeds in 2,4 times ($p < 0,05$) an allowable level; the minimal concentration - in group of children of 9 years. Excess of allowable age levels of the maintenance in urine chromium, arsenic, cadmium and cobalt is not revealed.

For an estimation of exposition features of a metabolism identified in urine cancerogenic substances we lead the analysis of their maintenance in different age groups.

The estimation of age features of the share contribution identified cancerogenic substances

in the general cancerogenic structure urine city dwellers in view of the period biological accumulation (which maximum was compared to peak of their concentration in urine), has defined a priority cancerogenic substances in ascending order the period of their accumulation in an organism: lead, which period of accumulation in an organism has on the average made 4,2 years with the first peak of the maximal deducing from an organism in the age of 2th years at a level of concentration in urine 0,5 from allowable; strontium, average which period of accumulation 4,3 years with the maximal primary deducing with urine at 7-years age; nickel, which period of accumulation has on the average made 5,0 years with the first peak of the maximal deducing in the age of 5 years at a level of concentration in the urine, exceeding allowable in 3,9 times ($p < 0,02$); Cobalt and beryllium, accumulations having the average period in an organism 6,0 and 6,3 years, accordingly, at the first pique of the maximal concentration in urine for cobalt in 5 years and beryllium in 2 years; cadmium, with the average period of accumulation in an organism of 12,5 years and a primary maximum level of deducing with urine in 12 years.

Taking into account the tendency of growth / decrease in levels of concentration of deducing revealed cancerogenic substances with urine during the different age periods of a life the greatest danger represent: strontium, cobalt, nickel - which dynamics of concentration in urine tended to decrease on a level of primary peak of deducing, probably, as a result of insufficient activity of enzymes protective a metabolism and amplification of processes of bioaccumulation.

Intensification at increase in an exposition of deducing from an organism with urine such cancerogenic substances as beryllium, lead, cadmium, chromium (the increase in a level of deducing in comparison with peak of their concentration in urine has made on the average 2,4 times ($p < 0,02$), 1,5 times ($p < 0,05$), 3,0 times ($p < 0,02$), 1,9 times ($p < 0,05$), accordingly, probably, it is connected to activation of enzymes of a metabolism neutralizations.

Age tendencies of concentration identified in urine cancerogenic substances, described by the polynomial equations, have allowed to predict character of deducing cancerogenic substances, indirectly determining features of their metabolism in an organism. Thus for secretory systems and an opportunity of increase in accumulation in an organism in currents of a life define the highest cancerogenic danger: strontium, lead, бериллий at enough high reliability of the revealed age tendencies ($R = 0,95$).

Hence, as a result of the analysis of a level of concentration, the share contribution and the age tendency of change identified in urine cancerogenic substances the greatest danger as a result of their accumulation is represented with strontium, cobalt, cadmium, nickel.

Concerning identified in urine of lead and beryllium the authentic tendency of increase of intensity of their deducing (removing) with urine in more senior age groups is marked, that, probably, is connected to activation certain protective fermental systems of an organism.

Blood is the universal liquid fabric of an organism reflecting not only морфофункциональное a condition of other bodies, systems and realizing maintenance of a homeostasis, but also total influence on an organism of polluting substances of an environment (B.A. Revich, 1990; N.F. Farashchuk, J.A. Rahmanin, 2004). In the literature there are numerous maintenances of metals given about interrelation in the surrounding and industrial environment with their maintenance (contents) in whey of blood of the person (E.A. Mozhaev, A.N. Litvinov, 1988; I.V. Mudryj, 1997; V.M. Boev, I.L. Karpenko, L.R. Salihova, etc., 2001; B.A. Revich, 2001).

Research of blood of inhabitants of Magnitogorsk on the maintenance of chemical substances identified: arsenic, cobalt, strontium, nickel, хром, бериллий, cadmium, lead which concentration did not exceed an allowable level at the maximal parameters for lead, cadmium, chromium and minimal for arsenic, strontium and beryllium.

Research of the share contribution revealed поллютантов in structure of a cancerogenic structure of blood has defined prevailing concentration of nickel in group of persons of 40-49 years; strontium and cobalt - in groups of 20-

29 years and 40-49 years; chromium - in the age of 13-29 years and 40-49 years; beryllium and cadmium - in 13-19 years and 50-59 years, lead - during 30-39 years age.

The analysis of the age tendency of concentration identified in blood cancerogenic substances has revealed disposable rise of concentration of lead in age group of 30-39 years with the tendency of decrease in more advanced ages, that, probably, is caused by the long period of his accumulation and activation specific protective systems of an organism; two-single rises of concentration through the 20-years period of strontium, chromium; cobalt and cadmium in 13 and 30 years; thrice rise of concentration beryllium through a 20-years interval (10; 30 and 50 years).

Authentic dependence of growth of concentration of nickel in blood with increase in age is received. The revealed features, probably, reflect, waviness of character of activization certain protective fermental systems in an organism of the person, one of making active which factors is the level of concentration of elements in fabrics - targets and in blood. Thus wave character of change of concentration in blood considerably differs from character of their changes in urine where the periods of increase are observed more often, defining thus the big biological sensitivity and reactance of the given fabric of the organism, carrying out adjusting function system of maintenance of a constancy of blood, as internal environment of an organism.

Hence, it is possible to assume, that the raised (increased) level of concentration cancerogenic substances in blood reflects infringements of a metabolism of adaptive reactions, their increase in urine - defines a degree of intensity of the given processes in reply to negative influence of environment. In this connection, established close to as much as possible allowable levels of concentration in blood of lead, chromium and cobalt (the maximal concentration of lead exceed allowable in 2,4 times, $p < 0,05$) at existing deficiency of their deducing with urine and the high maintenance in objects of an environment, define infringements participating in a metabolism their structures, the population causing high health hazard, growing during a life.

Close to as much as possible allowable to concentration of cadmium and nickel in blood on

a background of their intensive deducing with urine and the high maintenance in objects of OS, presumably, define their raised receipt in an organism, activate metabolic processes during all life with critically dangerous periods in 13-19 years and 50-59 years.

Significant growth of disease by malignant new growths of reproductive sphere, "early development" a cancer and increase in values of relative risk of diseases at young age of women, no less than a significant gain of disease a cancer dairy iron for the period of research (on 74 %; in the Russian Federation the gain of disease a cancer dairy iron for this period has made 46,3 %, V.V. Dvojrin with co-authors, 1994), allow the basis to assume about the importance of the cumulative remote cancerogenic effect on a background of reproductive infringements at the women living in conditions strong anthropogenesis of influence on a population.

From 36 various risk factors and the patients distributed in groups with a cancer dairy iron and healthy women, on size of factor ранговой correlations and to character of communication(connection) of each factor with disease of a cancer dairy iron us it is established the basic 9 factors: cancerogenic substances chemical substances, the temperature factor in conditions of manufacture on a background oppression immunity; age; spontaneous abortions; background diseases dairy iron, фибромиома a uterus; diseases of a thyroid gland; environmental contamination; primary bareness; birth of children dead; congenital developmental anomalies and congenital anomalies at children; alcohol; smoking. Other factors of reproductive character have direct, but weak communication with development of a cancer dairy iron.

Thus, the significant risk of development of a cancer dairy iron defines the polyfactor: a combination external (cancerogenic substances, cocancerogenic substances and high temperature); internal (background diseases dairy iron; from reproductive infringements is a primary bareness, spontaneous abortions on a background of high concentration пролактина in whey of blood. The high maintenance prolactin in blood it is possible to attribute to the conditions determining internal origin a risk of development of a cancer dairy iron and a cancer of genitals at women of reproductive age.

The role external chemical factors of an environment in development of a cancer dairy iron and a share of the contribution of industrial adverse factors in a level of disease by a cancer dairy iron in V.S. Koshkinov's works (1989) is established and shown. On model of working women of Magnitogorsk metallurgical combine. On workplaces gradation of concentration cancerogenic and коканцерогенных substances are established; time of an exposition to separate and to a complex of chemical compounds. The correlation analysis, carried out to it in group of patients with a cancer dairy iron has revealed dependence between age, when the tumour and 16- by factors of them 124 (professional and nonprofessional) factorial attributes is found out. With the help of the mathematical factorial analysis the share of the contribution to formation of disease by a cancer dairy iron by a cancer dairy iron sets of such attributes, as a multicomponent dust, benzo(a)pyrene, oxides of the nitrogen, equal 22 % is determined; chronic background diseases and influence pairs toluene, benzene - 12 %. Time of an exposition when the tumour has been found out in working women of metallurgical combine - 19,5 years.

Trades of women among which the cancer dairy iron was registered is stackers of a fire-resistant brick, formers in foundry manufacture, drivers the crane, operators in manufacture of hot hire. Persons of these trades subject to a multicomponent dust with excess of maximum concentration limit in 92 times, the basic component of an industrial dust - oxides of iron, make up to 84 % in the general structure of components; to oxides of nitrogen, which excess of maximum concentration limits on workplaces in 1,5 times; to benzo(a)pyrene in concentration 231-327 maximum concentration limits; to pairs toluene, пиридина; to high temperature (up to 50° C).

At studying trades of women among the urban population, fallen ill with a cancer dairy iron, a cancer of a body of a uterus and яичников are teachers, tutors, bookkeepers, medical workers, sellers, handymen.

In 1998 disease a cancer dairy iron (without workers of a metal works) has made women of urban population 88,01 on 100000, disease of working women of combine, accordingly 170,00, i.e. at working women of combine of the same age group (29-49 years) the parameter is higher almost in 2 times ($p < 0,01$).

The given fact is, in our opinion, conclusive argument for the benefit of a recognition the basic factors of an environment (especially industrial) on a background of chronic diseases with infringement of reproductive function, in development of malignant new growths dairy iron.

From histologic forms of a cancer dairy iron meets hypostasis (38,4 %) more often, ferruterosus (21,2 %), not so are rare low differentiation with flat cells and moderately differentiated - 6,4 %.

With flat cells, a cancer is diagnosed for the persons working at metallurgical combine: drivers the crane, operators the machine tool hot hire, the working woman of tracks at a factory, the controllers who are carrying out the technical control over quality of hot hire. They are women in the age of from 35 until 47 years, worked on manufacture from 13 until 25 years.

Our data will be coordinated to results of epidemiological research of V.S. Koshkinoy (1989) which has come to a conclusion, that feature of new growths dairy iron at working women of metallurgical combine is the greater percent (7,4) with flat cells of a cancer. N.A. Kraevsky carried given form malignant new growths to meets seldom.

Let's note, that the persons who were fallen ill with a cancer dairy iron, were exposed in conditions of manufacture to influence not only chemical cancerogenic substances and kocancerogenic substances, but also such nonspecific factors, as high temperature and radiant heat.

Testing of chemical elements in healthy and tumoral fabrics dairy iron inhabitants of city has shown high concentration (mkg / kg) of 23 elements both in healthy, and in tumoral fabrics. The straight line, strong communication is received ($r = 0,80$) between a cancer dairy iron and influence chemical cancerogenic substances, kocancerogenic substances, high temperature, radiant heat in conditions of manufacture on a background oppression immunity.

Probably, the temperature factor and change of the immune status were the basic conditions of display of the cancerogenic mechanism at women. The straight line, strong communication is received between a cancer dairy iron and such factors, as age ($r = 0,80$), spontaneous abortions ($r = 0,70$), background diseases dairy iron, a uterus ($r = 0,70$). The

straight line, average communication is found out between a cancer dairy iron and disease of a thyroid gland ($r = 0,60$), environmental contamination and a cancer dairy iron ($r = 0,60$), primary barrenness and a cancer dairy iron a cancer dairy iron ($r = 0,60$).

The highest maintenance is established Ag, As, Si, Sb, Cr, Cd, Pb, Be, Fe, thus a difference of concentration Ag, Cr, Be, Cd, Pb, Fe in healthy and tumoral fabrics authentically does not differ ($p > 0,05$). In a tumoral fabric dairy iron are established authentically above ($p < 0,05$), than in a ealthy fabric the maintenance of zirconium, magnesium, silicon, arsenic. In this connection, the cancer airy iron in conditions anthropogenous on a population can be considered influences as the remote bioeffect of an exposition ecological and to production factors: conventional to cancerogenic substances (Ni, Cr, Be, As, Cd, Fe, Zr) and a number of other chemical elements (Si, Pb,) which probably cause precancerogenic damage of a fabric up to malignant regeneration, cause changes immune system on type oppression at women. Results of research will form a basis of formation of groups of risk with the purpose of the prevention of development of a cancer dairy iron at women of young age.

As direct correlation communication of average force ($r = 0,6$) between a cancer dairy iron and environmental contaminations outside of manufacture is received, but the high maintenance of various chemical elements in fabrics dairy iron inhabitants of a city population which section material was investigated, probably, this number surveyed is not enough to attribute a cancer dairy iron a cancer dairy iron to ecologically caused diseases.

Thus, at planning and carrying out of the actions directed on preventive maintenance of malignant new growths, it is necessary to form groups of risk that demands their preventive diagnostics, diagnostics of primary infringements of a metabolism of adaptive systems and application of various improving measures on restoration of a metabolism that will promote the prevention of malignant new growths.

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