could be a reason of developing immunosuppression. Decreasing expression levels of these genes can be used as a marker of developing immunodepression.

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INFLUENCE OF COMBINED EFFECT OF ASBESTOS DUST AND RADIATION IN DOSAGE OF 0,2 GY ON ENERGY METABOLISM IN LONG-TERM PERIOD

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The study of remote effects of radiation damage influence is one of important lines of radiation medicine as it touches such socially meaningful problems like longevity, reproductive function, genetic effects of radiation on posterity, blastomogenic and non-blastomogenic effects, etc. The living body's bioenergetic disorder is of great importance in the pathology of X-ray sickness. It has been established that during the exposure the electron transport process in the cytochrome system, in chondriosomes of cells is broken and the process of oxidative phosphorylation disunites. The metabolic process regulation failure in cells can be not only the result, but also the most important component of pathogenetic mechanisms of radiation damage. The purpose of the present research has been the experimental study of cytochrome oxydase (CCO) and succinate dehydrogenase (SDG) energy metabolism enzymes' activity in tissues of adrenal bodies and immunocompetent organs and cells in the long-term period after a combined effect of radiation and chrysotile-asbestos dust.

For the realization of the purpose 3 sets of experiments on 40 nondescript white rat males weighing 180±20 g were carried out. I group – intact (n = 10), II group – poisoned with chrysotile-asbestos dust (n = 15) and III group – poisoned + X-rayed (n = 15). For the simulation of experimental asbestosis the chrysotile-asbestos dust was administered to the trial rats' lungs (intratracheally) by the method of Gorodetskaya Ye.N. in the modification of Parashina V.I.. The III group animals were exposed to the radiation of 0,2 Gy one time 90 days before the investigation on the radiotherapy unit Agat-PM^{60}Co. The animals were killed by an incomplete decapitation method in two months after the intratracheal administration. The animals were killed according to the International recommendations on carrying out medico-biological research using animals (WHO Chronicle, 1985). For the investigation lymphocytes were segregated from the peripheral blood and homogenates were prepared from the liver, milt, and thymus, lymph glands of the small intestine and adrenal bodies. The research findings were analyzed by standard methods of variation statistics using Student's test criteria.

As the investigations showed, when affected with chrysotile-asbestos dust, the CCO and SDG enzymes' activity in the adrenal body decreased 1,6 times and 3 times ($p<0,001$) accordingly. In the III group animals subjected to the combined effect a sharp decrease of the SDG activity up to 0,014±0,002 ($p<0,001$) was registered, and the CCO activity didn't differ authentically from the control parameter. In its turn, these enzymes' activity decrease was also registered in the peripheral blood lymphocytes: in the II group the SDG activity decreases twice ($p<0,001$), and the CCO one – 1,4 times ($p<0,05$). Proceeding from the findings one can resume that in the abovementioned cells the energy metabolism enzymes' activity decrease in the long-term period takes place, when subjected to the combined dust-radiation factor.

In the thymus at the asbestos dust affect the SDG activity increase 1,8 times ($p<0,01$) was registered, and the CCO activity decreased up to 0,117±0,011 ($p<0,01$). In the II group animals the CCO activity was fixed at the level of 0,259±0,027, and in the control animals this factor was within the limits of 0,198±0,012 ($p<0,05$). From the side of SDG a tendency to increase compared to the control was depicted in the thymus. As the investigations showed, in the II group animals an authentic SDG activity increase was registered in the liver and lymphatic glands: 17 times and 8,5 times ($p<0,001$). In this case after asbestic poisoning the SDG activity increase was attended by the CCO activity decrease 1, 8 times ($p<0,05$) and 1,4 times ($p<0,01$) accordingly. There were no significant changes in the liver and lymph glands of the small intestine registered in the animals after the dust-radiation factor from the side of the CCO activity, its content almost conformed to the control values. The SDG enzyme's activity increase 4 times in the small intestine lymph glands and 10 times in the liver ($p<0,001$) was placed on record. The milt CCO activity in the animals after the dust pollution and combined effect didn't change authentically ($p>0,05$), and from the side of the SDG activity the 1,9 times decrease compared to the control value ($p<0,05$) in the II group, 2,1 times – in the III group ($p<0,05$) was registered.

The found out many-valued enzyme activity changes substantiate the supposition about a varied level of metabolic cost associated with specific and non-specific responses of the body at the combined effect of the factors. The high energy metabolism activity degree seems probable to be associated with the concentration of catecholamines, glucocorticoids and the dehydrogenase change rate in the Krebs cycle at the radiation injury of the body as one of the compensatory responses of the body to noci-influences. It was found out in the experiment that in the long-term pe-

riod after the combined effect the SDG activity increase in the liver and lymph glands and its decrease in the milt, adrenal bodies and lymphocytes take place. The low CCO activity in the long-term period is registered in the peripheral blood lymphocytes.

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METALLIC MERCURY EFFECT ON THE INDICES OF OXIDATIVE STRESS IN PERSONS WITH NEUROLOGICAL DISORDERS

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Metallic mercury is known to be one of the more toxic nonradioactive substances. Its exposure leads to the disorders in psychical and neurological states. Thereby the role of oxidative stress in the pathology development of the central nervous system (CNS) induced by the exposure to metallic mercury is not full studied.

Purpose This investigation aimed to study some indices of the antioxidant system and lipid peroxidation in the worker with neurological disorders after occupational exposure to metallic mercury.

Material and methods The employees who worked under harmful conditions more than 10 years have been examined. The following groups have been choosed to study: the persons without the diseases of the nervous system formed Group I, the persons with the vegetative disfunction (VD) - Group II, the persons with the newly revealed diagnoses of chronic mercury intoxication (CHI) - Group III, the patients with the long lasting occupational diseases of CMI-Group IV and the control Group V.

Nitrogen oxides (NO) level was determined using the spectrophotometric method base on its stable metabolites - nitrates and nitrites in the blood sera by means of of the GRIESS reagent. The concentration of the reduced glutathione (RG) in the whole blood was determined using the ELMANN reagent (DTNB). The superoxidedismutase (SOD) activity in the whole blood was determined based on the delay degree of adrenalin autooxidation in the alkaline vehicle. The determination of ceruloplasmin (CP) is based on the turbidimetric specific reaction which occurs between the anticeruloplasmin polyclonal antiserum and its corresponding antigen in optimal pH conditions and in the presence of polyethyleneglycole polymer by means of the test kits "SENTINEL" (Italy). The uric acid (UA) level in the blood was measured using the fermentative colorimetric method based on the end point with the standard by means of the test kits "DIACON" (Germany) with the biochemical analyzer "CORMAY MULTY" (Poland). The active products of tiobarbituric acid (TBA-AP) the content of with was determined using the spectrophotometric method in the interaction between malon dialdehyde and tiobarbituric acid were used as second products of the lipid peroxidation processes. The statistical processing of the results was performed using the soft-ware "STATISTICA". The comparisons of the average values of the quantitative signs in the Groups were performed using the ANOVA method by Kraskel-Wollis with the following paired inter-group comparison of the values by means of the U-method Mann-Whitney with the use of the BONFERRONI correction. The statistically significant difference in the comperation in pairs was taken under $P<0.005$. The study results are presented as the average and standard declinations.

Results and discussion The state of analysis of the antioxidant system indices has revealled the lower level of RG in the persons Groups III (0.76±0.16 mkM/ml, p=0.000) compared with the indices of the control Group (0.99±0.17 mkM/ml). The decrease in this index (0.79±0.21 mkM/ml, p=0.000 and 0.84±0.17 mkM/ml, p=0.000 respectively) compared with the control values has been revealed in the worker of Groups I and II, too. The SOD activity study has revealed the decrease in this value in all groups of the persons exposed to mercury. The fermentative antioxidant activity in the persons of Groups II and III, approaching to the values, was 10.79±3.45 U/mgHb and 10.20±3.57U/mgHb, respectively. The activity of this ferment (11.32±4.56 U/mgHb) was higher than the values above and was lower than the control indices(14.91±4.58 U/mgHb, p=0.000) in the workers having no pathology of the nervous system. It should be note that a partial restoration of SOD activity up to 11.43±4.46 U/mgHb, but not reaching the control level (p=0.001) was observed to be in the persons with the revealed diagnosis of occupational disease after stopping the mercury exposure. The CP level in the blood of the workers of Group I was lower (33.48±6.57mg/dl, p=0.003) compared with the control indices (36.61±4.15 mg/dl). The level of this analyte in the persons of Groups II and III did not differ from the control values and was 35.25±5.55 mg/dl and 36.83±5.91 mg/dl respectively. Thereto, the trend to the decrease in the CP contents has been revealed in the persons of Groups IV (33.13±5.29 mg/dl, p=0.011) compared with the control values. The level of uric acid in the blood sera of the persons examined did not significantly differ from indices of the control Group. However, it should be noted that there was a trend to increasing in this analyte in the persons of Group IV (303.3±83.7 mkM/l, p=0.023) compared with the control values (263.4±45.0 mkM/l). The alterations in the antioxi-