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.

The work is submitted to III International Scientific Conference “Basic Research”, Dominican Republic, April, 10-20, 2008, came to the editorial office on 19.03.2008.

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-

dant system were found to follow by the accumulation of the second products of lipid peroxidation (LPO) only in the persons of Group III (5.44±3.46 mkM/l), thereby, there were no significant differences from the control values (4.43±2.37 mkM/l, p>0,005). As to studying the polyfunctional index level - nitrogen oxide it should be noted that there was a slight (p>0.005) decrease in its level in blood sera of the workers of Groups I and II (35.33±9.29 mkM/l and 34.34±78.74 mkM/l, respectively) compared with the control values (39.23±13.78 mkM/l). Thereby, the trend to increase in this index was observed to be in the persons with the diagnosis of occupational disease, revealed at present (38.41±11.99 mkM/l), compared with the persons of Groups I and II (p=0.090 and p=0.050, respectively). Simultaneously, the long-term stopping the exposure to the toxicant in the workers with the revealed diagnosis of CMI was not found to lead to the alteration in the NO metabolite concentrations in the blood sera (38.95±11.51 mkM/l), compared with the indices in the patients examined with the diagnosis revealed at a present. So, SOD activity index was found to be the most sensitive one to the mercury exposure in the workers of all the groups. This ferment is known to take part in the dismutation reaction of superoxide-anion radical and the decrease in its activity is observed in inducing the tumour process, in the case of metal intake deficiency entering the active ferment centre. In this connection, it may be supposed, that the exposure to metallic mercury leads to the disorders of metabolism of this metal or induces the inhibition of the active SOD centre. The decrease observed in the fermentative antioxidant function was found to follow by the decrease in the reduced glutathione concentration, giving together a more pronounced disorder degree of antioxidant systems: there is an opinion that the interaction between reduced glutathione and the radicals may be effective only under conditions of the removing O^{-}_{2}, that's why glutathione may form with SOD an original antioxidant systems. The reactions with forming the reactive thyil radicals may be developed in the disorder of SOD activity. Thus, the restoration of the concentration of the reduced glutathione in the persons with diagnosis of occupational diseases having no exposure to metallic mercury at the background of the decreased SOD activity may lead to the intensification of oxidative processes. This fact, possible, plays a definite role in progressing the neurological disturbances observed in the persons of this Group. As to ceruloplasmin and uric acid, their participation in the oxidative stress processes in exposure to metallic mercury was not found to be significant, in all probability. The accumulation manifestations of active oxygen forms need to study not at the level of second products of lipid peroxidation, but in the form active radicals.

The work was submitted to to the International Scientific Conference «Medical, social and economic problems of population health preservation», Kemer (Turkey), May 24-31, 2008, came to the editorial office on 29.04.2008.

DIFFERENCE IN RATIO OF "GROWTH" NITROGEN AND "MAINTENANCE" NITROGEN IN C_3 AND C_4-PLANTS

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One way to promote plant productivity lies in nitrogen nutrition various level usage for photosynthesis intensity regulation. The C_4 – plants (amaranth, panic grass, etc.), due to their special type of photosynthesis, have arrange of advantages over C_3-plants (wheat, celosia, etc.) in taking carbon dioxide and reaching high productivity (Magomedov I.M., 1988). Nevertheless, for C^4-plants the searches of ways to promote the productivity are also important. In C_4-plants the nitrogen intake photosynthetic efficiency (NIPE) defined as photosynthesis per nitrogen unit is significantly higher, than in C_3-plants (Brown R.H., 1978). However, for not all research men stick to such point of view (Koshkin Ye.I. and others, 1955), clearing up the reasons underlying such a phenomenon is rather topical. The purpose of the present work has been the follow-up study with intent to test the hypothesis about the direct dependence of NIPA on the C_4-photosynthesis intensity in amaranth leaves, and also the nitrogen status value clarification for the photosynthesis intensity. The study objects were – amaranth (C_4-plant) and celosia (C_3-plant) of the Amaranthaceae family. We supposed that in young leaves, where the protein synthesis was going on, the photosynthesis rate (PR) should be higher, than in old ones, where the protein synthesis was restricted. The findings testified that the PR of amaranth young and old leaves in nitrogen variant with an eye to $1dm^2$ of the surface was high. At the irrigation with the nitrogen free solution the PR decrease occurred. The PR with an eye to dry weight with nitrogen supply remained at the same level in both young and old leaves; but with nitrogen lack a significant PR decrease took place, especially in lower leaves. The dry weight of both old and young leaves of amaranth was twice as high, than that of the C_3-plant. The photosynthesis intensity per 1 mg of chlorophyll was higher in young amaranth leaves both with and without nitrogen; the excluding of nitrogen from the solution didn't change the amaranth PR. In old leaves it was lower, than in young ones. The amount of nitrogen in amaranth old leaves was by 20-25 % lower, than in young ones. The same picture was observed at the NIPE calculation. The value of this factor in amaranth, both in young and old leaves with and without nitrogen, was much higher, than in C_3-plant. As it was shown in our previous work (Shumilova A.A., Magomedov I.M., 1994), indeed, in amaranth the NIPE is significantly higher,