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REDOX BALANCE IN WHITE RATS' SPLEEN IN THE DYNAMICS OF EXPERIMENTALLY DEVELOPED CARCINOGENESIS

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Introduction. The problem of malignant growth is one of the most relevant in medicine and biology. Despite accomplishments in the learning of the causes and features of oncological disease, the frequency and mortality from them continue to increase. The tumors artificially induced by certain carcinogens in laboratory animals provide an opportunity to explore various aspects of carcinogenesis that cannot be effectively studied directly on the human body. One of them is the dimethylhydrazine model, which is an effective tool for the study of the characteristics of chemically induced carcinogenesis. The aim of the work was to study the changes of oxidation-reduction balance in the spleen tissue under chemically induced carcinogenesis

Methods. The research was conducted on 100 mature white rats with body weight of 185-190 g., kept in standard vivarium conditions. Carcinogenesis was modeled according to the method of V. P. Deryagina (2009). The concentration of TBC-active products, diene and triene conjugates (DC,TC), Schiff base was studied in the homogenate of the spleen; activity of catalase (CAT), Superoxide dismutase (SOD), Glutathione peroxidase (GP), Glutathione reductase (GR) were studied by the methods of Vlaslo V. V. (2012).

Results. Under conditions of induced oncogenesis, a significant 1.2 times increase was detected in DC concentration during the 1st month of administration, 1.4 times – in the 2nd month, 1.6 times – in the 3rd and 4th months, 1.7 times – in the 5th and 6th months; introduction of this substance raises the DC concentration during the 7th month 2.3 times ($P < 0.001$) in comparison with the same indicator of the control group of animals. A similar growth trend was observed during determination of TC concentration under conditions of induced oncogenesis. Throughout 1, 2, 3, 4, 5, 6, 7 months, the concentration of SB significantly increases 1.1; 1.3; 1.5; 1.7; 1.8; 2.02 and 2.2 times, respectively, in comparison with the same indicator in the control group of animals. Under the conditions of experimental carcinogenesis, an increase in the content of TBC-active products in the spleen tissue homogenate was observed at all periods of the study ($P < 0.001$). Under DMH-induced carcinogenesis, the activity of CAT was significantly decreasing in the 1st (3.3 times), the 2nd (3.2 times), the 3rd (3.3 times), the 4th (3.7 times), 5th (4.7 times), 6th (6.4 times) and 7th month of oncoprocess modeling 7.4 times compared to the same indicator in the control animals group. It has been experimentally established that during development of the oncological process, the activity of SOD in the spleen tissue is significantly increasing in the first months of DMH injection, whereas, starting from 5 months, it decreases. The lowest activity of SOD was observed in the 7th month of administration – 2.9 times ($P < 0.001$).

The activity of the GP significantly increases in the 1st (by 14.6%) and the 5th (by 18.1%) month, while it decreases by 66.2% in the 7th month of carcinogen introduction. The activity of GR in the 1st month of observation increased significantly by 16.3%, while in all subsequent periods there was a tendency towards a systematic reduction of GR, with the lowest activity in the 7th month (by 69.1%) compared with the activity of the enzyme in the control group of animals.

Conclusions. In conditions of chemically induced carcinogenesis, the disturbance of the oxidation-reduction equilibrium was established due to the accumulation of products of lipoperoxidation and TBC-reactive substances and reduction of antioxidant enzymes activity.

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