The influence of orally administered nanostructural highly activated charcoal on functional activity of hematopoietic progenitor cells in the culture of diffusion chambers *in vivo*

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Background. It has been established that nanostructural highly activated charcoal administered orally for medical purposes removes toxic substances of endogenous and exogenous nature. Peroxidation plays an important role in the pathogenesis of acute irradiation exposure, it seems appropriate to use the sorption properties of the test substance to minimize the damaging effect of irradiation on organism. Hematopoietic system is most sensitive regarding irradiation, consequently, investigation of early stages of haematopoiesis is appropriate and relevant.

Objective. To investigate hematopoietic progenitor cells of healthy and irradiated animals under the influence of charcoal with highly activated carbon.

Methods. 24 Wistar rats were orally fed charcoal (bulb density 0.12 g/cm^3) with fodder at the rate of 1.2 g per animal for 3 days before and at the day of the irradiation. Rats' femoral bone marrow cells under sterile conditions were placed in diffusion chambers with semisolid agar at a rate of 1 x 10^5 cells per chamber and cultured for 8 days in the peritoneal cavity of CBA mice. On the 8th day of cultivation, the number of colonies and their morphological features were analysed under an inverted microscope (Olympus, Japan).

Results. When comparing the results of the bone marrow cultivation of animals irradiated at a sublethal dose, and animals that were fed charcoal for 3 days before irradiation, the differences in the efficiency of colony formation were found, namely, 6.0 ± 0.8 colonies and 5.1 ± 1.1 clusters per 1 × 10^5 of explanted cells were found for irradiated animals, and 9.1 ± 1.3 colonies and 20.2 ± 2.4 clusters per 1 × 10^5 of explanted cells were found in animals that were previously fed charcoal.

Conclusions. As a result of the analysis of the obtained data, we came to the conclusion that the test substance improves colony formation in comparison with the group of irradiated animals fed charcoal. This process occurs at the level of stem cells and its nearest progenies.

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