

XXV International Baldin Seminar on High Energy Physics Problems
"Relativistic Nuclear Physics and Quantum Chromodynamics"



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Analysis of dose-dependent effects based on the statistical significance data of the irradiation effect on neurogenesis in C57BL/6J mice

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Heavy charged particles irradiation of the brain leads to the development of progressive cognitive impairment in adults. Partially, the cause of disorders suppression of neurogenesis processes in the dentate gyrus of the hippocampus. But due to the different response of cells, it is difficult to determine the factors that lead to cognitive impairments. To solve this problem, mathematical models of adult neurogenesis are being developed, which are mainly based on data of irradiation C57BL/6J mice of different ages. However, the models do not take into account the entire amount of experimental data, but only a part due to the difficulty of comparing of quantitative data of different experiments.

To summarize the results of irradiation of C57BL/6J mice, we used a comparative analysis of the effects based on the statistical significance of these experiments. During the analysis, were used data on the rates of stages of neurogenesis, the reaction of neurogenesis to irradiation, as well as the results of experiments on the co-labeled of cellular markers. A decrease in the number of cells with an increase in the irradiation dose was chosen as the initial hypothesis. As a result of the analysis, it was possible to identify effects that do not fit into the initial hypothesis of a dose-dependent reaction of cells and, most likely, manifest themselves in narrow intervals of the doses considered. Taking these effects into account in mathematical models of adult neurogenesis can improve the accuracy of predicting the reaction of cells to irradiation.

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