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Abstract
The induction and repair of DNA double-strand breaks (DNA DSB) were analyzed in primary hippocampal cell culture under the action of Co60 g-rays or protons at 3 Gy dose. For investigation of DNA DSBs formation, we established two cell cultures: neuronal cell culture, created with using of antimitotic agent 1-β-D-arabinofuranosil cytosine (AraC), and primary hippocampal cell culture without influence of Ara-C includes both neuronal and glial elements. The study of DNA DSB formation and repair in neuron and primary cell culture was conducted using DNA repair protein markers –γH2AX and 53BP1.
It was established that the gH2AX/53BP1 foci quantity reached the maximum 1h after both types of radiation and decrease in 24 h post- irradiation. However, 24h post-irradiation the radiation-induced foci (RIF) level remained significantly different to non-irradiated samples. In case of proton irradiation, a higher number of RIF was observed 24 h after exposure compare to γ-irradiation.
The study of the formation and elimination kinetics of γH2AX foci in primary hippocampal cell culture showed the maximum of foci number 1 h after exposure to γ-rays. There was a delay in foci elimination, followed by an increase in the number of RIF 4 h after proton irradiation. The structure of RIF clusters in astrocytes becomes more complex in comparison with neuronal cells after exposure to both types of irradiation throughout the entire post-radiation period.

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