

Overview of the activities of the Laboratory of Radiation Biology

Wednesday, 22 November 2023 10:10 (30 minutes)

The presence of a wide range of radiation sources, and above all, beams of heavy ions of various energies at the JINR basic facilities, provides a unique opportunity to solve the fundamental problems of modern radiobiology, astrobiology, neurophysiology, molecular biology and genetics, as well as practical applications in radiation medicine and radiation risk assessments on Earth and in space.

The research program of the Laboratory of Radiation Biology is aimed at studying the mechanisms of action of ionizing radiation with different physical characteristics at the molecular, cellular, tissue and organismal levels of biological organization.

Within the framework of the research program, the following fundamental and applied problems of modern radiation biology will be addressed: studies of formation and repair of clustered DNA damage after exposure of normal and tumor cells of mammals and humans to radiations with different characteristics; studies of radiation-induced gene, structural and complex mutations in mammalian and human cells; studies of violations of behavioral reactions and pathomorphological changes in various brain structures, critical organs and systems of irradiated animals under normal conditions and under the action of radioprotectors; studies of the mechanisms of neurodegeneration under the action of ionizing radiations; development of new approaches to improving the biological effectiveness of radiation therapy of tumors and methods of targeted delivery of radiopharmaceuticals; development of new setups and dosimetry systems for irradiating biological samples, methods for non-destructive analysis of unique samples, and test systems for automated computer processing of biological data; formulation of new mathematical models and computational approaches for radiobiology, bioinformatics and radiation medicine; identification of mechanisms and pathways of catalytic synthesis of prebiotic compounds under the action of radiation.

References

[1] The Laboratory of Radiation Biology. Official web-site <http://lrb.jinr.ru/index.php/en/>

[2] Brochure "Radiobiological research at JINR" 2023 http://www.jinr.ru/wp-content/uploads/Brochures/JINR_A4_brochure_radiobiology

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