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Biological research at the deep underground low radiation background laboratory (DULB-4900) of Baksan Neutrino Observatory

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Deep underground laboratories at physical research centers possess an outstanding potential for hosting interdisciplinary experiments, which became more systematic since 2010s, and studies are focused on tasks of biophysics, radiobiology, astrobiology, microbiology and medicine. Molecular genetics group of DLNP JINR initiated cooperative studies at Baksan Neutrino Observatory (BNO INR RAS) in the deep underground low radiation background laboratory (DULB-4900), located in the Elbrus region (North Caucasus, Russia) beneath (~2.5 km) the peak of Andyrchy mountain. First biological experiments were performed in 2019 and aimed to validate for the first time the response of complex model organisms to the low background radiation by modern genomics techniques (transcriptomics). The experiment was successfully completed and contributed to the understanding of such important environmental factors as natural background radiation. Further genomic experiments of our group deal with biological impact of specific components of natural background radiation and deep underground exposome. To sum up, our works approved the uniqueness of DULB-4900 laboratory for biological research and importance of cooperation between deep underground facilities around the world to obtain more solid knowledge on biophysical phenomena. All these aspects will be discussed in the report.

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