

Study of the radioprotective properties of the Damage Suppressor (Dsup) protein on a model organism *D. melanogaster* and human cell culture HEK293T- The theme 1132

Modern research of the proposed problem requires a wide range of the main methods from proteomic to the methods of condensed matter physics, and it does take to an account of all participants in the project in the JINR. Experience related to the planned years will be good in conclusions when expected results will be obtained in planned periods, and when will be the JINR organization is the best place for conducting and coordinating these studies among all other participate institutions in the present project.

The results of the radioprotective properties of the new Damage suppressor (Dsup) protein on a model object *D. melanogaster*, on human cell cultures and the next studies of the mechanisms of Dsup protein action, present the main streams of newly planned research. The studies on Dsup protein showed that it can bind nucleosomes in the cell and protect DNA and the Dsup protein has been shown on animal and human cells, that express this protein. It was found that after irradiation the cells had fewer DNA breaks than control cells. Owing to the paucity of human data on radiation-induced mutations, animal data on such problems are used to study the protection of the risk of irradiations of humans using this type of method. Secondly, in the process of performing the above works and plans, the project will be studied the generation of *D. melanogaster* lines and human cell cultures expressing this protein will make it possible to assess the possibility of increasing their radio-resistance during the irradiation by the various source of ionizing radiation. Also, the study of the mechanisms of action of the Dsup protein will contribute to understanding the fundamental laws of chromatin organization in the nucleus of the cell and its influence on the regulation of gene expression.

The solver achievement is at first the group of precious specialists in the field of proteomics and radiation genetic. Carrying on experiments to assess the effect of the Dsup protein on the radioresistance of human cell lines is with the construction of dose-response curves (using the protons).

The researchers in the presented group plan to use the structural studies by SAXS, SANS (FLNP JINR), and RSA techniques (MIPT) for protein analysis, the important part of such research and is useful for both basic research and clinical applications. In this case, the project meets the required criteria for the scientific publishing and scientific presentations of originating results.

The project considers the experiences of the research group related to planned years are on a good level and a large amount of the coordination of all planned experiments by the JINR organization is the right place for solving proposed radiobiological studies.

Planned timetable, the balance between the time frames and costs, description of the work plan, benefits for JINR arising from this activity, from the structure, and planned procedures were determined. The study of the radiation level risk using the technique of the radiation facilities are also meaningful for the use and application of JINR's experimental facilities, as it regards obtaining the worldwide level of the research results at JINR.

The working group will be able to predict the mechanisms of action of the Dsup protein will contribute to understanding the fundamental laws of chromatin organization in the nucleus and its influence on the regulation of gene expression, this will be the successful strength of this project.

The project meets all the required criteria for scientific publishing, the invited presentations of originating results, qualified processes of doctorate study, and stands for the full-time equivalent of the workload of researchers, engineers, technicians, laboratory assistants, and young people. It means that the human resources of the laboratory are in the good age group with adequate experiences and past achievements in this research field, which were demonstrated by scientific result competencies. Since the project started only a few months ago, there is no actual presented publication list, but the group has the ability to published in the category of the relative location of journals along with the range of an Impact factor distribution with the first quartile (Q1), as was demonstrated in the project on similar previous topics to the making the research. Modern research of such a problem requires a wide range of the main methods from proteomics and the methods of condensed matter physics, as it does the laboratory. The proposal meets all relevant criteria of the Questionnaire for the extraordinary session of PAC, it is missing the finished qualifying processes of doctorate study, but the full-time equivalent of the workload of the students shows that the research group educates their Ph.D. students.

Within the ranking scheme in the Questionnaire for the extraordinary session, I propose categorized this project to A and as a realizable project in the full funding process.

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In Bratislava, Slovak Republic: May 28, 2021