

Joint Institute for Nuclear Research



**MODERN PROBLEMS OF GENETICS,
RADIOBIOLOGY, RADIOECOLOGY
AND EVOLUTION**

*The Second International Conference
dedicated to the 105th anniversary of the birth
of N. W. Timofeeff-Ressovsky and the 70th anniversary
of the paper «On the Nature
of Gene Mutations and Gene Structure»
by N. W. Timofeeff-Ressovsky, K. G. Zimmer,
and M. Delbrück*

Yerevan, September 8–11, 2005

ABSTRACTS, PAPERS BY YOUNG SCIENTISTS

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The collection contains theses of the reports and competition papers by young scientists presented at the conference. The theses and young scientists' papers are published in the authors' wording.

Современные проблемы генетики, радиобиологии, радиоэкологии и эволюции: Вторая междунар. конф., посвященная 105-й годовщине со дня рождения Н. В. Тимофеева-Ресовского и 70-летию публикации статьи Н. В. Тимофеева-Ресовского, К. Циммера и М. Дельбрюка «О природе генных мутаций и структуре гена» (Ереван, 8–11 сентября 2005 г.): Аннот. докл. и статьи молодых ученых. — Дубна: ОИЯИ, 2005. — 318 с.

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Сборник содержит аннотации докладов, представленных на конференцию, а также короткие исследовательские статьи, включенные в конкурс молодых ученых в рамках конференции.

Издание представляет интерес для специалистов в области генетики, радиобиологии, радиоэкологии и эволюции.

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N.V. TIMOFEEV-RESOVSKY AND RADIATION GENETICS

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Researches into the radiation genetics of drosophila, performed by N.V. Timofeev-Resovsky in 20-30's, became the basis of modern radiation genetics. He pioneered in the detailed study of the dose dependence of genetic effects and in phenotype description of radiation-induced mutations. These experiments gave rise to the Hit principle and Target theory, which played a large role in creation of the methodology of genetic risk assessment after irradiation. Nikolai Vladimirovich, using the results of his own experiments on drosophila, first calculated the doubling dose for the frequency of spontaneous mutations in humans. The extrapolation method he used for calculations was subsequently applied for estimation of genetic risks after exposures of humans to radiation in all the UNSCEAR reports, the first one being issued in 1956. In a series of his papers, dedicated to analysis of congenital and acquired hereditary diseases, N.V. Timofeev-Resovsky emphasized that radiation-induced mutations and, therefore, hereditary diseases can be provoked by quite low radiation doses.

The author of the present paper had invaluable experience of being in contact with Nikolai Vladimirovich to consider the problems of radiation genetics of natural algae populations inhabiting the South-Ural radiation track area. N.V. Timofeev-Resovsky made a number of experiments on the effects of uranium nuclear fission products (NFP) in algae, and on the determination of the coefficients of accumulation of some radionuclides, NFP mixture components, by various algae types. Nikolai Vladimirovich always took a keen interest in experimental data, obtained in our laboratory, which were reported on his seminar, and, subsequently, he actively supported such studies during conferences and dissertation discussions.