SATURDAY - 720 / SATURDAY - 720 - The Effects of Gamma-Radiation on Membrane Activity of *Pseudomonas aeruginosa* GRP3

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Abstract

Background: Gamma (γ) radiation is an ionizing one and can cause changes in structure and function of biological molecules such as enzymes activity and lipid peroxidation processes. The low doses of γ rays can affect growth, cause morphological changes and change membrane activity in soil bacteria *Pseudomonas aeruginosa* which was considered as indicator for monitoring radio-toxicity level of polluted environments. For revealing the impact mechanisms of γ rays with low doses, it was studied the effects on the ion fluxes, ATPase activity and chemiluminescence of lipid peroxidation of irradiated *P. aeruginosa* GRP3 wild type. **Methods:** As source for γ rays, the ^{60}Co (dose ranging 2.35-2.57 μSv/h) was used. The H+ fluxes across cytoplasmic membrane were determined for whole cells using selective electrode, and ATPase activity of membrane vesicles was determnied colorimetrically. The chemiluminescence was detected after treatment of irradiated cells with H_2O_2; the results were analyzed by LabView computer program. **Results:** After irradiation of bacteria for 15 and 30 min, compared with non-irradiated control samples, the H^+ efflux rate increased by ~24% and 70% respectively, DCCD (0.3 mM) sensitive flux rate increased on ~80% after 30 min irradiation. ATPase activity was decreased by ~30%, but after 30 min irradiation it was increased on ~58%; moreover, this activity was *N,N'*-dicyclohexylcarbodiimide-sensitive, inhibited the F_0F_1-ATPase: it was increased by more than 60%. Detection of chemiluminescence has shown that the intensity amplitude was increased by ~15% after 30 min irradiation and by ~11% compared with 15 min irradiated sample. **Conclusions:** γ rays with low doses affect the membrane F_0F_1-ATPase enzyme and lipids, which could be cellular targets for γ rays with low doses. The results can be applied for designing monitoring experiments using bacteria for evaluation of environmental radioactive toxicity levels