EFFECTS OF ACUTE LOW DOSES PROTON RADIATION ON POTASSIUM CURRENTS RECORDED FROM T98G CELL LINE

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Abstract

The low and high dose effects of ionizing radiation is of public interest because of the potential risk from exposure to environmental sources of radiation, occupational exposure and potential clinical benefits of radiotherapy. High doses of ionizing radiation clearly produce deleterious consequences in humans, including cancer induction, but at very low radiation doses the situation is much less clear. Several lines of evidence from molecular, biochemical, and biological studies outlined that different mechanisms are operating in cells and organisms at low and high radiation doses. In this work it is evaluated the effects of protons (H^+) radiations at different doses (from 0 to 2 Gy) on T98G cells, derived from human glioblastoma. The effects of low dose H^+ radiations are studied by measuring the total potassium (I_K) membrane current, using whole-cell configuration of the patch-clamp technique. H^+ particles irradiations have been performed at the Radiobiology facility at the INFN-LNL 7MV Van de Graaff CN accelerator. Protons of 3.0 MeV (0.8 MeV energy at the cell entrance surface, corresponding to LET values of 28.5 keV/μm) have been used. Sham irradiated cells were used in all the experiments as control (un-irradiated) cells.The amplitude of I_K, recorded from T98G cells irradiated by H^+, showed as a function of the applied voltages a significantly decrease of K^+ current amplitude for the dose of 0.25 Gy and even more for 2Gy. In conclusion in this work it is showed for the first time, to our knowledge, the feasibility of I_K recording from T98G cells. It has been observed that the amplitude of I_K recorded after irradiation is strongly dose-dependent.

Keywords: *proton radiation, low dose, patch clamp, K+ current, non-linear effect*