Induction of Chromosomal Aberrations in Human Cells after Irradiation with Filtered and Unfiltered Beams of 1 Gev/amu Iron Ions**

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To determine whether shielding materials that might be utilized for radiation protection of astronauts would affect the RBE of HZE particles, such as those of concern for deep space missions, we irradiated non cycling G0 monolayer cultures of contact inhibited normal human fibroblasts with 1 Gev/amu iron ions with and without filtration with various thicknesses of Aluminum (Al) or polyethylene (CH_2) and then measured the frequencies of chromosome-type aberrations (dicentrics and excess fragments) in the first post-irradiation mitosis. Irradiations were carried out at the NRSL facility at Brookhaven National Laboratory. For doses ranging up to 4 to 6 Gy, the dose response for the total of these aberrations per cell was not significantly affected by beam filtrations up to 5.4 cm Al or up to 11 cm polyethylene, relative to the unfiltered beam. Neither was the dose response significantly different for unfiltered beams of 300 or 600 Mev/amu iron ions relative to the 1 Gev/amu iron ions. The studies with 1 Gev/amu iron ions were repeated four different times over a period of four years, in each case with coded samples so the individual scoring aberrations would not know the irradiation conditions employed. Comparison of the same effects in parallel experiments using ^{137}Cs gamma-rays allowed us to estimate that the RBE for aberration induction by these HZE iron ions for these acute (high dose-rate) exposures was approximately 3.0.

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