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Dose response for chromosome aberrations in human lymphocytes and fibroblasts after exposure to very low doses of high LET radiation

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The relationship between biological effects and low doses of absorbed radiation is still uncertain, especially for high LET radiation exposure. Estimates of risks from low-dose and low-dose-rates are often extrapolated using data from Japanese atomic bomb survivors with either linear or linear quadratic models of fit

In this study, chromosome aberrations were measured in human peripheral blood lymphocytes and normal skin fibroblasts cells after exposure to very low dose (1 – 20 cGy) of 170 MeV/u ^{28}Si- ions or 600 MeV/u ^{56}Fe-ions. Chromosomes were analyzed using the whole chromosome fluorescence *in situ* hybridization (FISH) technique during the first cell division after irradiation, and chromosome aberrations were identified as either simple exchanges (translocations and dicentrics) or complex exchanges (involving >2 breaks in 2 or more chromosomes).

The curves for doses above 10 cGy were fitted with linear or linear-quadratic functions. For ^{28}Si- ions no dose response was observed in the 2-10 cGy dose range, suggesting a non-target effect in this range.