

Non-target effect for chromosome aberrations in human lymphocytes and fibroblasts after exposure to very low doses of high LET radiation

M.Hada,¹ K. George,² and F. A. Cucinotta³

¹USRA, Division of Space Life Sciences, Houston, TX 77058, USA,

²Wyle, 1290 Hercules Drive, Houston, TX 77058, USA,

³NASA Lyndon B. Johnson Space Center, Houston, TX 77058, USA

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 survivor 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 (.01 – 0.2 Gy) of 170 MeV/u ²⁸Si- ions or 600 MeV/u ⁵⁶Fe-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 0.1 Gy were more than one ion traverses a cell showed linear dose responses. However, for doses less than 0.1 Gy, ²⁸Si- ions showed no dose response, suggesting a non-targeted effect when less than one ion traversal occurs. Additional findings for ⁵⁶Fe will be discussed.