Paper ID: 30634
oral

SPACE LIFE SCIENCES SYMPOSIUM (A1)
Radiation Fields, Effects and Risks in Human Space Missions (5)

Author: Dr. Honglu Wu
NASA, United States

RBE OF ENERGETIC IRON IONS FOR THE INDUCTION OF EARLY AND LATE CHROMOSOME ABERRATIONS IN DIFFERENT CELL TYPES

Abstract

Numerous published studies have reported the RBE values for chromosome chromosomes induced by charged particles of different LET. The RBE for chromosome aberrations in human lymphocytes exposed ex vivo showed a similar relationship as the quality factor for cancer induction. Consequently, increased chromosome aberrations in the astronauts' white blood cells post long-duration missions are used to determine the biological doses from exposures to space radiation. The RBE value is known to be very different for different types of cancer. Previously, we reported that the RBE for initial chromosome damages was high in human lymphocytes exposed to Fe ions. After multiple cell divisions post irradiation, the RBE was significantly smaller. To test the hypothesis that the RBE values for chromosome aberrations are different between early and late damages and also different between different cell types, we exposed human lymphocytes ex vivo, and human fibroblast cells and human mammary epithelial cells in vitro to 600 MeV/u Fe ions. Post irradiation, the cells were collected at first mitosis, or cultured for multiple generations for collections of remaining or late arising chromosome aberrations. The chromosome aberrations were quantified using fluorescent in situ hybridization (FISH) with whole chromosome specific probes. This study attempts to offer an explanation for the varying RBE values for different cancer types.