Paper ID: 49426
oral
student

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

Author: Mrs. Rosalin Goss
National Aeronautics and Space Administration (NASA), Johnson Space Center, United States,
rosalinflood@gmail.com

# PROTON AND FE ION-INDUCED EARLY AND LATE CHROMOSOME ABERRATIONS IN DIFFERENT CELL TYPES

**Abstract**

An early stage of cancer development from radiation exposure is believed to be genomic instability (GI), which accelerates the mutation rate in the descendants of the cells surviving the initial damage. To investigate GI induced by charged particles, we exposed human lymphocytes ex vivo, human fibroblasts, and human mammary epithelial cells to high energy protons and Fe ions, and collected chromosomes at different cell divisions after exposure. Chromosome aberrations were analyzed with fluorescence in situ hybridization (FISH) with whole chromosome specific probes. Comparison of chromosome damages immediately after irradiation to late damages after multiple cell divisions indicated that, after proton irradiation, the frequency of late aberrations was about half of the initial value for both the lymphocytes and epithelial cells. In contrast, after Fe ion irradiation, the late chromosome aberration frequency was about half of the initial value for human epithelial cells, but was significantly lower for human lymphocytes, suggesting different relative biological effectiveness (RBE) values between early and late chromosome aberrations and between different cell types. In addition to human cells, we isolated bone marrow cells from CBA/CaH and C57BL/6 mice, and irradiated the cells to charged particles for analysis of cell survival and chromosome aberrations after multiple cell divisions. After Fe ion irradiation, the late chromosome aberration frequency was similar to the early damages for CBA cells, but different for C57 cells. Our results suggest that RBE values can be different for different cell types, and for the same cell type of different mouse strains.