

# **Development and Characterization of a High Throughput Screen to investigate the delayed Effects of Radiations Commonly Encountered in Space**

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Astronauts based on the space station or on long-term space missions will be exposed to high Z radiations in the cosmic environment. In order to evaluate the potentially deleterious effects of exposure to radiations commonly encountered in space we have developed and characterized a high throughput assay to detect mutation/deletion events and/or hyperrecombination in the progeny of exposed cells. This assay is based on a plasmid vector containing a green fluorescence protein reporter construct. We have shown that after stable transfection of the vector into human or hamster cells this construct can identify mutations, specifically base changes and deletions, as well as recombination events, e.g., gene conversion or homologous recombination, occurring as a result of exposure to ionizing radiation. Our focus has been on those events occurring in the progeny of an irradiated cell that are potentially associated with radiation induced genomic instability, rather than the more conventional assays that evaluate the direct (immediate) effects of radiation exposure. Considerable time has been spent automating analysis of surviving colonies as a function of time after irradiation in order to determine when delayed instability is induced and the consequences of this delayed instability. The assay is now automated permitting the evaluation of potentially rare events associated with low dose, low dose rate radiations commonly encountered in space.