ROLE OF AGE, RADIATION QUALITY AND GENETIC BACKGROUND ON LEVELS OF SURROGATE CANCER BIOMARKERS

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One of NASA's primary goals is to improve the understanding of the carcinogenic process related to high LET exposures to better define risk. Current radiation quality factors used to determine cancer risk for space radiation do not provide the accuracy needed, and debate exists as to the relevance of the experimental studies they're based upon. To formulate better risk estimates, key data is needed including how age, genetic background and radiation quality affect carcinogenic potential. In these studies we are using a large bank of primary pre-stasis mammary epithelial cells to address these important questions. To date these strains of various normal and defined abnormal genetic backgrounds have been grown to produce stocks and exposed to Si 93 MeV/u and cesium. Our plans are to determine levels of centrosome aberrations, as a surrogate marker of carcinogenic potential. Preliminary studies have been performed using some strains to determine baseline levels of centrosome aberrations at early times post irradiation. The importance of loss of p16 expression, a sporadic event in individual cells of normal women in vivo and often seen in breast tumors, will also be investigated in relation to radiation quality effects and centrosome aberrations. Stem cells are known to be of importance in cancer etiology and we have additional plans to determine how various radiation qualities affect the proportion of stem/progenitor cells. Preliminary studies have been performed to identify optimal markers to use for mammary stem cell identification. In total during the first year of this project we have set up the required stocks needed for subsequent experiments, optimized assays and performed some of the radiation quality exposures. Data from these early studies will be presented. Once studies are completed data should allow us to better quantify the effects of space radiation and its relationship to the carcinogenic process.