

02:1421 CLINICAL AND HEMATOLOGIC STUDIES OF IRRADIATION: CYTOGENETICS. Littlefield, L. Gayle (Oak Ridge Associated Universities, Inc., Tenn. Medical Div.). Contract AT(40-1)GEN-33.

The primary objective is to determine the effects of whole-body irradiation on the production of chromosomal aberrations in human cells. We are conducting chromosomal studies according to standard cytogenetic procedures on lymphocytes and bone marrow preparations from (1) patients who receive acute whole-body exposures in a high exposure irradiation unit (avg. 40 R/min) in preparation for marrow transplantations and (2) patients with systemic malignancies who receive protracted exposures in either a medium (avg. 1.6 R/min) or low (avg. 1.5 R/hr) whole-body irradiation facility. We are investigating the use of chromosomal aberrations as biological dosimeters, attempting to establish whether there are differences in aberration yields in lymphoid vs. myeloid cells, and comparing the chromosomal breakages in patients who have received low, medium, and high dose rate exposures.

Lymphocyte and bone marrow preparations from a patient who received an acute exposure of 500 R whole-body irradiation before a marrow transplant, and from a man who was accidentally exposed to pure gamma radiation at the same facility, were analyzed for radiation-induced chromosomal aberrations. Calculations of absorbed doses from the frequency of ring and dicentric chromosomes in the lymphocyte preparations from these two men were in good agreement with dose estimates obtained by physical dosimetry.

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