

Distribution of Radon Induced Micronuclei in Respiratory Tract Cells

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The relationship between exposure and dose to critical cells in the respiratory tract following radon inhalation needs to be established to calculate risk. When have evaluated the frequency of radon-induced micronuclei as a marker of the distribution of damage and dose. Experimental animals were exposed to ⁶⁰Co to estimate radiation sensitivity of respiratory tract cells and by inhalation to radon and its progeny to evaluate the influence of deposition and dose on damage. Physical and biological variables were evaluated to determine the usefulness of cellular damage to predict dose distribution. Physical parameters included; the influence of total dose, dose rate, LET and aerosol carrier on damage in respiratory tract cells. Damage increased as a function of dose and LET with little influence of dose-rate for the radon exposure. Aerosols size and concentration also changed the frequency of micronuclei observed in deep lung fibroblasts. Biological parameters included; the influence of strain and species, the role cell cycle, and the role of cell type on damage and dose distribution. Micronuclei served as a marker of dose but did not reflect radiation sensitivity in strains or species that are sensitive to lung cancer induction. For high LET radiation from Radon there was little influence of cell cycle on the induction of micronuclei. Radon induced micronuclei increased as linear function of exposure in a WLM regardless of the cell type or location in the respiratory tract. The slope of the exposure response in respiratory tract cells was ranked from lowest to the highest as follows; nose, (0.012), deep lung fibroblast (0.018), tracheal epithelium (0.034), deep lung epithelial cells (0.066) % micronuclei /WLM. The importance of this research in relating exposure to dose and dose to risk will be discussed. Research funded U.S.DOE/OHER under DE-AC06-76RLO 1830.

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