

Induction of Micronuclei Following Exposure to ^{60}Co Gamma Rays in the Respiratory Tract

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To understand the relationships which exist between inhalation exposure and biologically effective dose to different cell populations in the respiratory tract it is essential to study cells both in vivo and in vitro. Methods were developed using a medium with a low serum content to culture epithelial cells from the trachea, nose and deep lung. The response of these cells to radiation exposure were compared to that in deep lung fibroblasts. Young Fischer 344 or Wistar rats were exposed to graded doses of ^{60}Co (0.0, 1.0, 2.5, or 5.0 Gy) and sacrificed, cells were isolated and placed in short term culture. Using cytochalasin B to block cytokinesis it was possible to score the frequency of micronuclei in cells that had divided. Since all the cells received similar ^{60}Co doses, differences in responses would be related to cell sensitivity. It was determined that the optimum time in culture to collect first division cells from the nose and trachea was 72 hours, while the optimum time for deep lung fibroblasts or epithelial cells was 96 hours. The slopes of the dose-response relationships were used to compare and rank the sensitivity of the different cell population. This background information makes it possible to evaluate distribution of effective dose and damage from a range of exposure environments.

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