

The Induction of Micronuclei as a Model for Radiation Sensitivity of Respiratory Tract Cells Exposed to ⁶⁰CO Gamma Rays

S.P. Bao¹, P.W. Harwood², B.H. Wood², and A.L. Brooks²

¹U. S. Transuranium and Uranium Registries, Washington State University, Richland, WA 99352; ²Pacific Northwest Laboratory, Richland, WA 99352.

To understand the relationships between inhalation exposure and biologically effective dose to different cell populations in the respiratory tract it is essential to evaluate the sensitivity of these cells both *in vivo* and *in vitro*. Methods were developed to culture deep lung fibroblasts and epithelial cells from nose, trachea and deep lung, and measure the frequency of micronuclei in binucleated cells as an indication of radiation sensitivity. Young Fisher 344 or Wistar rats were exposed to graded doses of ⁶⁰CO (0.0, 1.0, 2.5 or 5.0 Gy) and sacrificed, cells were isolated and placed in short term culture using a low serum medium. Since all the cells received similar ⁶⁰CO doses, differences in response would be related to cell sensitivity for the induction or repair of micronuclei. No difference was observed for micronuclei in nasal epithelial cells between the two strains of rats. It was determined that chromosome damage in cells from different regions of respiratory tract increased linearly with the dose, the slopes were 87.1, 76.2, 32.8, and 28.7 micronuclei/1000 binucleated cells/Gy for deep lung epithelial cells, fibroblasts, tracheal and nasal epithelial cells, respectively. The deep lung cells were = 2-3 times as sensitive for micronuclei induction following external low LET radiation as the nasal and tracheal epithelial cells. This background information makes it possible to evaluate distribution of effective dose and damage from a range of exposure environments.

USTUR-0044-95