

Comparative Clastogenic Sensitivity of Respiratory Tract Cells to Gamma Rays

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To understand the relationships between exposure and damage to different cell populations in the respiratory tract, methods were developed to culture deep-lungs fibroblasts and epithelial cells from the nose, trachea and deep lungs. Female F-344 Fisher and male Wistar rats were exposed to 1-5 Gy of ⁶⁰Co Y rays at a dose rate of 0.4 Gy/min. Cells were isolated for short-term culture, and the incidences of binucleated cells and micronuclei were determined. The incidences of micronuclei were determined in cytochalasin-B-induced binucleated cells at 72 h for nasal and tracheal tissue and 96 h for deep-lung fibroblasts and epithelial cells. Maximum frequencies of binucleated cells were found in the control nonirradiated cells at these harvest times, and the frequencies were not significantly affected at these harvest times by radiation exposure. No significant differences were found in the frequencies of micronuclei induced in the nasal epithelial cells isolated from female F-344 Fischer on male Wistar rats. Fibroblast cultured in different media and isolated from either female F-344 Fischer or male Wistar rats also showed a similar frequency of micronuclei. Over the doses tested, the frequency of micronuclei in the respiratory tract cells increased linearly with the dose. The slope were 92.2 ± 9.2 , 76.2 ± 7.9 , 32.8 ± 2.4 and 28.7 ± 3.4 micronuclei/1000 binucleated cells/Gy for deep-lung fibroblasts, tracheal epithelial cells and nasal epithelial cells, respectively. Deep-lung epithelial or fibroblast cells were about two to three times as sensitive for clastogenic damage as nasal and tracheal epithelial cells. The measurement of micronuclei in isolated respiratory tract cells. The measurement of micronuclei in isolated respiratory tract cells is very useful in assessing cytogenetic damage induced in different cell types by radiation.

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