

Induction of Micronuclei in Respiratory Tract following Radon Inhalation

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Male Wistar rats were exposed to radon and its progeny (0.0, 60, 262 and 564 WLM) and the frequency of micronuclei determined in deep lung fibroblasts, and deep lung, trachea and nasal epithelial cells with slopes of 0.28, 0.67, 0.34 and 0.11 micronuclei/1000 binucleated cells/WLM, respectively. Micronuclei in deep lung fibroblasts, isolated and cultured using two methods and media, demonstrated no differences in response. Biological damage was used to calculate the relationship between dosimetric units: alpha particle traversals "hits", dose in mGy, and exposure in WLM. The estimated number of alpha hits/Gy was (6.3). Radon exposure (170 WLM) resulted in the same frequency of micronuclei in deep lung epithelial cells produced by one alpha hit/cell. The values for dose/exposure relationships (mGy/WLM) ranged from 1.13-1.34 for deep lung epithelial cells, 0.47-1.09 for deep lung fibroblast, 0.34-0.67 for tracheal epithelial cells and 0.18-0.33 for nasal epithelial cells. Biological dosimetry can be used to relate exposure to damage, compare dosimetric units and validate physical models. This approach can be applied to any inhaled material capable of producing biological damage.

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