Combined Action of Ionizing Radiation and Chemical Inhibitors on Cell Recovery : Quantitative Estimation

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Abstract

The purpose of this work was to determine whether the synergistic interaction of ionizing radiation and some chemicals in Chinese hamster cells was related with inhibition of the liquid holding recovery (LHR) or with the production of irreversible damages which could not be repaired. Using the proposed mathematical model describing the process of the LHR and experimental data published by others it was demonstrated that the recovery constant, i.e. the probability of the recovery per time unit, was independent while the irreversible component was increased with drug concentration. It is concluded on this basis that the LHR process itself is not damaged after the combined action of ionizing radiation and chemical inhibitors of recovery, and that the mechanism of their action may be related with the enhanced yield of irreversible damages.

Assessment of Indoor Radon Pollution Released from Groundwater

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Abstract

Most of the indoor radon comes directly from soil beneath the basement or foundations. Recently, radon released from groundwater is found to contribute to the total inhalation risk from indoor air. This study presents the quantitative assessment of human exposures to radon released from the groundwater into indoor air. At first, a three compartment model is developed to describe the transfer and distribution of radon released from groundwater in a house through showering, washing clothes, and flushing toilets. Then, to estimate a daily human exposure through inhalation of such radon for an adult, a physiologically-based pharmacokinetic (PBPK) model is developed. The use of a PBPK model for the inhaled radon could provide the useful information regarding the distribution of radon among the organs of the human body. Indoor exposure patterns as input to the PBPK model are a more realistic situation associated with indoor radon pollution generated from a three compartment model describing volatilization of radon from domestic water into household air. Combining the two models for inhaled radon in indoor air can be used to estimate a quantitative human exposure through the inhalation of indoor radon for adults based on two sets of exposure scenarios. The results obtained from the study would help increase the quantitative understanding of risk assessment issues associated with the indoor radon released from groundwater.