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RADIOTOXICITY OF TRITIUM-LABELLED MOLECULES

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Abstract

The effect of tritiated organic compounds and ^{3}H-water on the growth of chloroleukaemia cells was studied in permanent suspension culture. In terms of environmental activity concentration. ^{3}H-leucine (protein precursor), ^{3}H-uridine (RNA precursor) and ^{3}H-thymidine (DNA precursor) were roughly 10, 100, and 1000 times as toxic as ^{3}HOH to rapidly growing malignant cells. In addition to measurement of the growth rate by cell counting, more subtle changes in the kinetic behaviour of the population were followed by pulse-labelling with ^{3}H-thymidine. As the technique of labelled mitoses showed, radiation-induced changes in population kinetics are apparent even after a very short, low level exposure of the cells to ^{3}H-thymidine (30-min pulse at 0.04 $\mu Ci\text{-}ml^{-1}$). These results indicate that in evaluating the harmful effects of tritium it is essential to consider several factors such as the chemical nature of the tritiated substance entering the body and the metabolic status of the cells of the organism.