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PAPER TITLE Effects of γ-quanta in the 0.1-50 cGy dose range on the conformation of chromatin in mammalian cells.

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ABSTRACT (See instructions overleaf)

The effect of ^{137}Cs γ-quanta on the chromatin conformation was studied by the method of anomalous viscosity time dependence. A few different cell types were exposed: VH-10 human fibroblasts, BALB\C mouse splenocytes, Sprague-Dowley rat thymocytes. The cells were irradiated within the 0.1-50 cGy dose range and then lysed for viscosity measurements. It was established for all types of cells that exposure to low doses of 0.5 cGy resulted in a statistically significant reduction of viscosity peaks. This reduction reached a maximum value approximately 40-60 min after irradiation. The reduction of viscosity was revealed at doses up to 4 cGy for human fibroblasts with the maximum effect of about 2 cGy. The opposite response, increase of viscosity, was observed after cell exposure to 10-50 cGy doses. From the linear approximation of this dose dependence, the increase of viscosity started at a dose of about 3±1 cGy. The effect of increased viscosity disappeared with time after irradiation, with kinetics similar to that of DNA repair. Repair of the chromatin conformation depended strongly on temperature in the 0-37°C range. To the contrary, kinetics of the 0.5 cGy effect did not depend on temperature. Thus, two different types of the chromatin response were observed in mammalian cells after low (0.5 cGy) and high (50 cgy) doses of irradiation. This study provides new evidence that doses as low as 0.5 cGy cause significant changes of the chromatin conformation in different types of mammalian cells.