THE EFFECT OF HYPOCHLORITE ON HUMAN ERYTHROCYTES PRETREATED WITH X-RADIATION

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Both hypochlorite and ionizing radiation induce processes of oxidation of biomolecules. The effects are dependent to a large degree on the dose of the oxidizing agent.

Previously, we observed that a given amount of gamma radiation split into small doses caused a lesser degree of hemolysis that the same amount applied as a single dose. The critical factors influencing this effect were the amount of the first dose and the time between doses.

In this study, we examined the effect of “low” doses of gamma radiation (40-400 Gy) on the hemolysis of erythrocytes induced by hypochlorite.

Erythrocytes in PBS (phosphate buffered saline), hematocrit 2%, were irradiated with doses of 40, 200 or 400 Gy. The dose-rate was 23.8 Gy/min. The suspensions were stirred during irradiation. After irradiation, the erythrocytes were incubated for 1, 3 or 4 hours at room temperature, and then hypochlorite was added to a 250 microM concentration. The control samples were erythrocytes treated only with NaOCl.

The level of hemolysis was determined after NaOCl addition. The degree of hemolysis of erythrocytes pre-irradiated with a dose of 400 Gy was lower than the hemolysis of erythrocytes treated only with NaOCl. The effect was dependent on the time between the end of irradiation and the addition of NaOCl. A slightly higher degree of hemolysis was observed for erythrocytes pre-irradiated with lower (40 or 200 Gy) doses of radiation.

The observed effect is similar to that obtained for radiation-induced hemolysis. It suggests that ionizing radiation may induce structural and/or functional changes in erythrocytes which make the cell more resistant to further oxidative damage.