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The influence of hypothermia on the ionizing radiation-induced γ-H2AX foci formation, micronuclei and clonogenic survival in A549 cells in relation to chromatin organization

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It is well known that hypothermia during in vitro irradiation of human cells affects the level of clonogenic survival, frequency of chromosome aberrations and DNA supercoil rewinding. The mechanisms of the hypothermia effect are not known but it was suggested that it may be related to chromatin condensation. Elucidation of the mechanisms of the hypothermia effect is interesting and important both from the perspective of understanding the cellular response to radiation and of the impact that the effect may have on the interpretation of experimental results. With this in mind, the aim of our study was to examine the influence of hypothermia on the ionizing radiation-induced dose-response relationship for γ-H2AX foci formation, micronuclei and clonogenic survival (SF) in relation to chromatin organization. In this study, two sets of experiments were performed. In the first experiment, A549 cells were kept at 0 ℃ and 37 ℃ for 30 minutes and then exposed to 0; 0.5, 1, 1.5, 2; 2,5 and 3 Gy of γ-rays In the second experiment, A549 cells were exposed to histone deacetylase inhibitor trichostatin A (TSA) for 18 hr prior to irradiation at 0℃ and 37 ℃. After irradiation samples were processed for analysis of clonogenic survival, micronuclei and gamma-H2AX foci. Our results revealed that the frequency of micronuclei in cells exposed at 0℃ to γ-rays was lower than after exposure at 37℃. The SF of cells exposed at 0℃ γ-rays to gamma-rays was higher than after exposure at 37℃. No effect of temperature was observed on the number of γ-H2AX foci. The pretreatment of TSA radiosensitized A549 cells. The results dealing with the influence of hypothermia on the ionizing radiation-induced effects in relation to chromatin organization will be presented during the ERRS conference.

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