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Measurement of reactive oxygen species formation in V79 cells

Ionizing radiation has been shown to be dangerous for living organisms. It can interact with target molecules directly or indirectly. Direct effect is the direct interaction of radiation with target molecules, while in the case of indirect effect the ionizing radiation interacts firstly with the surrounding medium (mostly with the water). Products of this interaction are agents capable to damage living cells. The most dangerous agents are the reactive oxygen species (ROS) such as hydroxyl radicals, peroxyl radicals, hydroperoxyl radicals or superoxide radicals. Their formation in water solutions can be modified by many factors such as dose, dose rate, chemical additives, etc.
Chinese hamster V79 cells were used for the study of reactive oxygen species formation after irradiation and chemical treatment. ROS were measured using the general oxidative stress indicator CMH2DCFDA, C6827, Invitrogen. Following were the conclusions: firstly, intensity of fluorescence was directly proportional to the concentration of the indicator or cells. The measured fluorescence intensity of the oxidized dye was also found to be linearly increasing with time at all concentrations tested. Secondly, increased formation of ROS was observed after addition of menadione in concentrations 5 - 500 μM and after irradiation of cell suspension with 60Co gamma radiation.

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