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DNA damage x bystander signalling mediated by soluble factors: A non mandatory relationship

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While the radiation effects on DNA are well known, the DNA damage and mechanisms involved in the radiation-induced bystander effects (RIBE) remain to be fully elucidated. C3H10T1/2 mesenchymal stem cells were analyzed in respect to RIBE in this work. An in vitro cell culture system was established to allow contact of the uninrradiated cells (bystander cells) with soluble factors delivered into the medium by the directly irradiated cells. DNA damage was evaluated by the formation of micronuclei (MN), which achieved a peak of 24 fold-increase upon 2Gy of radiation, similarly to the dose of 6Gy. However, the bystander cells did not show an increase of MN at any doses tested. The formation of γ-H2AX foci, formed to promote the repair of break sites of the DNA in response to radiation, was additionally evaluated. H2AX phosphorylation in directly irradiated cells was 3.5 fold-increased at the dose of 6Gy detected 30min after the irradiation, decreasing in the next 1h and increasing again 3h after the irradiation, which can be correlated to the G2/M cell cycle arrest or to an additional effort of the cells machinery to fully repair the damaged DNA. The responses of the irradiated cells were accompanied by an increase of reactive oxygen species. Although the DNA damage occurred in the directly irradiated cells, the soluble factors delivered by them did not trigger responses in bystander cell since the bystander cells showed no alterations in the evaluated parameters.

Biography

Amanda Nogueira Pedro is a biologist who completed her PhD at the age of 31 years in Molecular Biology at the Federal University of Sao Paulo (Brazil). She is currently performing her Postdoctoral at the University of Sao Paulo, focusing her studies in radiobiology for which account with the collaboration of renowned researchers in this field (from Brazil and USA). Beyond the studies in basic sciences she has also specialized in clinical trials. Most of her work concerned the understanding of the modulation of the hematopoietic system by different agents, including radiation.

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