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Effect of ionizing radiation on the proliferation of human embryonic stem cells

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We analyzed growth rates of seven hESC lines by measuring area of individual colonies. The doubling time averaged over all the colonies varies from 18.9 to 28.7 hours. We studied effect of 0.2 and 1.0Gy exposure on proliferation of these hESC lines. All cell lines showed similar reaction to IR, i.e. the number of cells dropped within 24-48 h; after that they recover and grow with the same rate as the sham-irradiated cells. The Relative Cell Survival (RCS) i.e. the fraction of cells in the irradiated samples relative to the sham-irradiated cells varied from 0.6 to 0.8 after 0.2Gy and from 0.1 to 0.2 after 1Gy IR. The RCS correlates directly with the doubling time, i. e. the faster cells grow the more radiosensitive they are. The doubling times and areas of individual colonies varies significantly for all cell lines. For all cell lines except WA22 we found no correlation between colony size and growth rate; however for several cell lines (H1, WA13, WA19) smaller colonies were more radiosensitive than the larger ones.

Biography

Irina V Panyutin has earned her Doctoral degree in Epidemiology from Moscow State Medical Academy in 1980 and has worked as an Epidemiologist at a Disease Control Station in Moscow, Russia. After coming to USA, she worked as a Research Scientist at Braton Biotech Inc., Rockville, Maryland from 1992 to 1996. Since 1996, she has been with the NIH, Nuclear Medicine Department. Her research interests include study of the effect of ionizing radiation on human embryonic stem cells survival, proliferation and differentiation.

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