

2Gy, 6Gy, 8Gy, 10Gy may be some ideal fractional doses with the better biological response

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Objective: To study the radiation response of the cancer cells to different fractional dose irradiation and explore the ideal fractional dose.

Methods: Observe the variability of cell cycle, cell proliferation, apoptosis, DNA damage and repair and the expression of related proteins of human breast cancer cell line MDA-MB-435 which was administrated by different dose of X-ray irradiation (0Gy, 2Gy, 4Gy, 6Gy, 8Gy, 10Gy, 12.5Gy, 15Gy, 20Gy). Flow cytometry was used to observe the rate of apoptosis and cell cycle arrest, CCK8 method and colony formation assay were used to examine cell proliferation, the expression of DNA damage and repair and other related proteins were detected with western blotting.

Results: The apoptosis of cell, G2/M phase proportion and the inhibition of cell proliferation were increased after irradiation with the increment of the exposure dose; those changes had an obvious increasing trend. The expression of apoptosis suppression protein Bcl-2 was decreased after different dose of irradiation. On the contrary, the apoptosis related protein Bax, Caspase-9 and BID were elevated after irradiation compared to control group (0Gy), the expression of Bax in groups 6Gy, 8Gy, 10Gy, 12.5Gy, 15Gy were significant higher than those in other groups, the expression of Caspase-9 were higher in the groups 2Gy, 4Gy, 6Gy, 8Gy than other groups, the expression of BID in the groups 2Gy, 4Gy, 6Gy were higher than others. G2/M phase arrest was related to the increase of ATR/ATM AND the reduction of CHK1, CyclinB1 and CDC25B. DNA damage and repair related protein Ku80 was increased after the irradiation in the groups 2Gy, 4Gy, 10Gy, 15Gy, 20Gy compared to control group, in contrast, the expression of it was decreased in the groups 6Gy, 8Gy, 12.5Gy. The expression of the Rad51 was increased after irradiation but the level of the groups 2Gy, 8Gy, 10Gy were lower than that of other groups.

Conclusion: X-ray irradiation will increase cell apoptosis, make cell block in G2/M phase and decrease the cell proliferation. But we can come to the conclusion that 2Gy, 6Gy, 8Gy and 10Gy may be the ideal fractional dose, as those can promote cell apoptosis, leads to DNA damage and inhibit its repair.

Biography

Hong Zhao is currently a MD student of the Department of Radiation and Medical Oncology, Zhongnan Hospital, Wuhan University. She has completed her Master's degree from the same department and has published 1 paper as co-author in reputed journal. Her major fields of interest are metabolomics and radiosensitivity of cancer.

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