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Dynamics of p53 protein in tumor cells caused by radiation

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The p53 protein is customarily called the genome guardian and considered the major tumor suppressor. Mutations in this protein are present in more than half of cancers and change the normal cell processes, affecting cell motility and invasion. The p53 protein regulates a number of key processes, including cell cycle arrest, DNA repair, apoptosis, senescence, and cell survival.
In our research, we investigated the effect of low doses of irradiation on the oscillatory dynamics of the p53 protein. The breast cancer cell line MCF7 was irradiated Co-60 gamma rays. The protein levels in irradiated cells were determined by Western blot analysis. In addition, the expression levels of selected p53-responsive genes were measured by means of the quantitative real-time PCR.
The oscillatory dynamics of p53 protein after irradiation at both low and high doses were detected. The results were further confirmed by measuring changes in the expression of p53-regulated genes p21, GADD45A, and MDM2.
A significant proportion of cancer patients receive radiation as a critical part of their treatment. Hence, the goal of our project is to assess the possibility of the p53 oscillation determination for prediction of the outcome of radiotherapy.

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