

The potential of resveratrol to sensitize MCF-7 cells to radiotherapy



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Abstract details



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Background: Radiotherapy is frequently used in the treatment of breast cancer. However, radioresistance remains the primary disadvantage of this therapeutic approach. Therefore, the search of chemicals, which could induce radiosensitivity is of great importance. One of these chemicals is resveratrol (RSV). Several investigations revealed RSV's ability to inhibit the expression of cancer-specific genes, induce changes in the cell cycle, and activate apoptosis. Our study aimed to investigate the effects of RSV on radiosensitivity and the expression of *BCL2* gene in the breast cancer.

Material and Methods: An X-ray linear accelerator was used to irradiate cells with 2 or 4 Gy doses. The anti-proliferative effect of RSV in MCF-7 cells was determined by colony formation assay. The apoptosis level and changes in the cell cycle were measured using the Muse Cell Analyzer. Real-time PCR was used to quantitatively determine *BCL2* gene expression.

Results: Our results indicated, that RSV decreased MCF-7 cell viability. When a combination of RSV and radiation therapy (IR) was used, the anticancer effects on cells were noticeably stronger. It was demonstrated that RSV+IR increased the proportion of cells undergoing apoptosis and the number of cells in the G2/M phase. Based on RT-PCR results, RSV+IR combinations statistically significantly reduced *BCL2* gene expression compared to RSV-alone or IR-alone treatment.

Conclusion: According to the findings of our study, resveratrol is a potential radiosensitizer of MCF-7 breast cancer cells. RSV and IR combinations decreased cell proliferation, which was associated with the induction of apoptosis and reduced expression of the anti-apoptotic *BCL2* gene.