EFFECT OF SIMULTANEOUS APPLICATION OF THERAPEUTIC ULTRASOUND AND SILVER NANOPARTICLES ON CARCINOMA CELLS A2780

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Abstract

Therapeutic ultrasound is increasingly applied as an adjuvant factor in pharmacological treatment. Could the capability to potentiate drug efficacy exhibit also some negative effect? Given the fact that the environment is increasingly becoming polluted by different products based on nanoparticles, it is necessary to ask the question: What is the effect of simultaneous application of ultrasonic field and metallic nanoparticles? Would it be possible to use this synergism for targeted therapy? The aim of the study was to study the viability of tumor cell lines after application of an ultrasonic field in the presence of metallic silver nanoparticles in vitro.

The A2780 cells were affected by ultrasonic field with maximum intensity of 2 Wcm⁻², metallic silver (Ag) nanoparticles <100 nm were present in the cultivation media. Viability of affected cells was evaluated by MTT assay and microscopy.

The results show a visible detrimental effect on the viability of the tumor cells after application of silver nanoparticles alone, as well as after application of ultrasound field at high intensities. The simultaneous action of ultrasound and nanoparticles leads to summation of effects; the experimental results show a significant decrease in cell viability, when compared to separate application of ultrasonic field or nanoparticles.

Application of appropriate ultrasound intensities may reduce viability of tumor cells that are cultured in the medium containing metallic silver nanoparticles. This effect could possibly be used for targeted therapy.

Keywords: nanoparticle, nanosilver, ultrasound, viability

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