

GOLD NANOPARTICLES IN ANTICANCER THERAPY

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Summary

Nanotechnology is a relatively young science focusing on the synthesis and studies of the objects with dimensions of the order of 10^{-9} meters. One approach to make the nanotechnology useful consists in application of nanoparticles in anticancer therapy. There are conducted studies aimed at the synthesis of totally new therapeutic compounds and increased efficiency of conventional therapies, among others – radiotherapy. It was demonstrated that administration of gold nanoparticles (GNPs) during the exposure of cells to ionizing radiation increases therapeutic effects by reducing their proliferation. Moreover, larger effects of radiation treatment combined with GNPs were obtained by using radiation energies in the range of keV instead of MeV. It was also described that irradiation combined with incubation of cells with gold nanoparticles coated with glucose decreases their ability to proliferate and increases the percentage of the cells entering on the apoptotic pathway. This leads also to changes in p53 protein expression and arrest of cell cycle in the G2/M phase, in which cells are most sensitive to radiation. Therefore, modifications of GNPs may help to develop innovative and highly effective anticancer drugs.