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Effect of Gold Nanoparticle Size on Radiation Therapy Enhancement for JC cells BINDESHWAR SAH, JING WU, MICHAEL ANTOSH, University of Rhode Island — Radiation therapy is a regularly used technique for the treatment of cancer therapy. Radiation therapy aims to maximize damage in cancer cells while minimizing effects on surrounding healthy cells. Gold nanoparticles (GNPs) have shown the potential to enhance the effects of X-ray irradiation on cancer cells. The purpose of this experiment is to investigate what size of gold nanoparticles can enhance radiation therapy. We performed an in vitro experiment (JC mouse breast cancer cells) using X-rays and gold nanoparticles of size 5, 15, 30, 50 and 100 nm. Cells were treated with the same total mass of gold (0.05 g) for each size, and different radiation energies were used (100, 250 and 350 kVp). A linear mixed model was performed with the logarithm transformation of survival fraction as the response variable, experiment id as the random effect covariate, and nanoparticle size, radiation dose and energy as fixed effect covariates. The results showed that all sizes of gold nanoparticles were able to reduce cell survival, and that 50 nm nanoparticles had the strongest effect. These results demonstrate that the size of gold nanoparticles plays a key factor in radiation enhancement.

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