TREATMENT OF CANCER USING GOLD NANOMATERIAL BASED PHOTODYNAMIC THERAPY (PDT)

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Abstract: Photodynamic therapy (PDT) uses light, molecular oxygen and a carrier substance/photo sensitizer (drug, nanomaterial etc.) to destroy tumorous tissue/cell. This therapy has been licensed to treat various types of cancers. In this work, we have used gold nanomaterial of various size and shape (rod, prism etc.) as the carrier substance. These nanomaterials were synthesized using solution phase method. A red laser light (671nm) was used as the light source of the PDT. We performed the PDT on Human SK-Br-3 breast adenocarcinoma cell lines using the red light and gold nanomaterial. The cells were fixed on a plate, and then gold nanomaterial was mixed and grown for 48-72 hours at 37°C. These cells were exposed to light in various time scales. Cells without nanomaterial were used as a control. Similar experiments were performed using cell specific antibody (anti-HER-2) for the specific attachment of gold nanoparticle to the cancer cells. The exposed cells were subjected to MTT assay to check the cell survival. Our results show that the PDT is effective using gold nanomaterial and also their size and shape plays an important role in killing the cancer cell.

Keywords: Nanomaterial, Cancer, photodynamic therapy, cell assays.

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