Fabrication of Fluorescein Isothiocyanate (FITC)-Doped Silica Nanoparticles and Gold-Coated Silica Nanoparticles for Locating and Killing Cancer Tumors

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Cancer treatment approach applying nanotechnology has many advantages compared to conventional chemotherapy and radiation therapy. Nanoshells are optically tunable core/shell nanoparticles that can be fabricated to strongly absorb in the near-infrared (NIR) region where light transmits deeply into tissue. If nanoshells are applied for cancer tumor imaging, using dark-field microscopy and optical coherence tomography (OCT) has caused inconvenience for cancer treatment process. We wonder if it is possible to make a nanomaterial that is capable of fluorescence for locating during surgery, as well as possessing photothermal effects to kill cancer cells. Our work in fabrication and investigation of gold-coated FITC-doped silica nanoparticle provides information on the effect of gold shell composition on the absorption spectrum of the dye. The next question is how to combine the advantages of these materials without affecting the optically properties of each other to provide a way to apply nanotechnology to cancer treatment. So, the main aim of the project is to fabricate and investigate the ability to locus and kill cancer cells when simultaneously applying two different types of nanoparticles: FITC-doped silica nanoparticles and gold-coated silica nanoparticles.

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