

Dendrimer porphyrin-decorated Gold Nanoshells for Synergistic Combined Phototherapy of Cancer

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Photodynamic therapy (PDT) is excellent method for the treatment of cancer. It involves the systemic administration of photosensitizers (PS) such as porphyrin and phthalocyanine, so PS transfers photon energy to generate cytotoxic reactive oxygen species (ROS) to kill cancer. In the case of photothermal therapy (PTT), it involves the conversion of absorbed photon energy into the heat by using gold nanomaterials. In this work, 3rd generation dendrimer porphyrin was deposited onto gold nanoshell coated silica nanoparticles via Layer-by-Layer method. The successful fabrication of this system was monitored by UV-Vis spectroscopy, high resolution TEM, and electrophoretic light scattering spectrophotometer. Also, photodynamic and photothermal effect of nanoparticles under light exposure was confirmed by conducting ROS generation and temperature increase test. Furthermore, synergistic combined phototherapy including PDT and PTT was achieved through cell viability using the MTT assay.