

Mesoporous Silica Nanoparticles Doped with Gold Nanoparticles for Combined Cancer Immunotherapy and Photothermal Therapy

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Cancer immunotherapy is a treatment that utilize host immune system to fight against cancer. For an efficient cancer immunotherapy, high amount of adjuvant such as CpG-ODN must be delivered into tumor site. Mesoporous silica nanoparticles (MSNs) could be used in CpG-ODN delivery due to good biocompatibility, high surface area and porosity. In this study, we synthesized MSNs decorated with gold nanoparticles (AuNPs) for delivery of high amount of CpG-ODN to tumor site to activate antigen-presenting cells infiltrated within the tumor for the induction of antigen-specific adaptive immune response. In addition, we induce a photothermal effect by the assembled AuNPs for enhancement of cancer immunotherapy efficacy by generating cancer antigen in tumor site. Negatively charged AuNPs were attached to the surface and pores of positively charged amine-modified MSNs and these nanocarriers could be used for loading of CpG-ODN. This platform enabled a high loading of CpG-ODN and dual therapy (immunotherapy and photothermal therapy) at the same time for effective cancer treatment.