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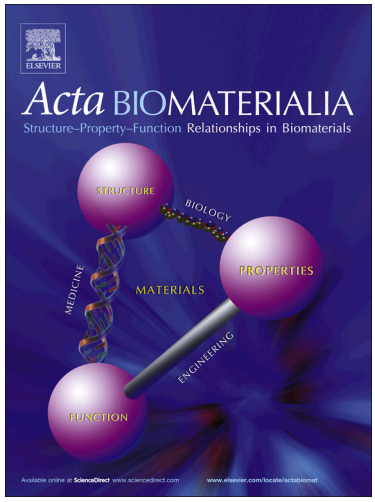

Full length article

Near-infrared light-activated red-emitting upconverting nanoplatform for T_1-weighted magnetic resonance imaging and photodynamic therapy

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Near-infrared light-activated red-emitting upconverting nanoplatform for T_1-weighted magnetic resonance imaging and photodynamic therapy

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Abstract

Photodynamic therapy (PDT) has increasingly become an efficient and attractive cancer treatment modality based on reactive oxygen species (ROS) that can induce tumor death after irradiation with ultraviolet or visible light. Herein, to overcome the limited tissue penetration in traditional PDT, a novel near-infrared (NIR) light-activated $NaScF_4$: 40% Yb, 2% Er@CaF_2 upconversion nanoparticle (rUCNP) is successfully designed and synthesized. Chlorin e6, a photosensitizer and a chelating agent for Mn^{2+}, is loaded into human serum albumin (HSA) that further conjugates onto rUCNPs. To increase the ability to target glioma tumor, an acyclic Arg–Gly–Asp peptide (cRGDyK) is linked to rUCNPs@HSA(Ce6-Mn). This nanoplatform enables efficient adsorption and conversion of NIR light (980 nm) into bright red emission (660 nm), which can trigger the photosensitizer Ce6-Mn complex for PDT and T_1-weighted magnetic resonance imaging (T_1-weighted MRI) for glioma diagnosis. Our