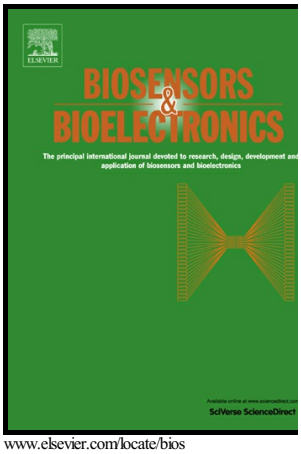

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Quantum Dots Decorated Gold Nanorod as Fluorescent-Plasmonic Dual-Modal Contrasts Agent for Cancer Imaging

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Abstract: Constructing integrative optical bioprobe with both fluorophores and plasmonic functional groups is of particular interest in precise co-localized bio-imaging probe development. Herein, we fabricated a novel hierarchical complex nanoparticle with fluorescent and plasmonic components spatially separated, which is composed of highly brilliant CdSe/CdS/ZnS QDs decorated gold nanorod (AuNR) with silicon coating. This complex structure served as an efficient dual-modality imaging contrast agent, where the potential fluorescence resonance energy transfer (FRET) between QDs and AuNR was avoided by the intermediate silica layer as well as minimized spectral overlap between QDs and AuNRs. The high-density loading of QDs was achieved by thiol-metal affinity driven assembly of hydrophobic QDs with thiolated AuNR@SiO_2 substrate, which is able to show a strong fluorescence emission. After amphiphilic organosilica-mediated phase transferring and functionalization with transferrin (Tf), these nanoparticles entered A549 cells and exhibited high contrasting fluorescent and dark-field signals for co-localized cancer cells imaging. The results demonstrate that these nanoparticles are potential candidates as dual modal probes for fluorescence and dark-field image.