



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP120588

Project Title:
Targeting the Acidic Tumor Microenvironment with Renal Clearable and pH Responsive Luminescent Gold Nanoparticles

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
The University of Texas at Dallas

Lay Summary:

Multifunctional nanoparticles allow the combination of a variety of molecular imaging modalities and local treatment of lesions, potentially catalyzing the shift of our current medical paradigm to "earlier detection and prevention". In particular, AuNPs with broad material properties hold great promise in cancer detection and therapy. However, several challenges remain to be addressed before they can be used as anticancer nanomedicines: (1) suboptimal in vivo pharmacokinetics as represented by high accumulation in the reticuloendothelial system (RES) organs (e.g. liver, spleen, bone marrow) and short blood circulation time; (2) severe nonspecific serum protein adsorption; (3) lack of in vivo tracking methods; and (4) inefficient active tumor targeting resulted from (1) and (2). To address these challenges, we proposed to develop renal clearable and pH responsive luminescent AuNPs, which can target acidic microenvironment of many solid tumors such as prostate cancers. Success of this project will yield a unique class of tumor microenvironment targeted AuNPs, which allows preoperative optical imaging for complete surgery resection of tumors; and noninvasive diagnosis and prognosis of cancer by SPECT when a chemically indistinguishable gold radioisotope. Not limited to cancer imaging, photodynamic effect and therapeutic doses of ^{198}Au will also make it possible for future cancer therapy with these renal clearable and pH responsive AuNPs.