



CANCER PREVENTION & RESEARCH  
INSTITUTE OF TEXAS

Award ID:  
RP140544

Project Title:  
Mapping Acidic Tumor Microenvironment With Renal Clearable pH  
Nanoindicators

Award Mechanism:  
Individual Investigator

Principal Investigator:  
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Entity:  
The University of Texas at Dallas

Lay Summary:

While local extracellular pH (pHe) of solid tumors is just slightly acidic compared to that of normal tissues, this tiny pH difference promotes cancer initiation, progression and metastasis, strongly affects cancer cell resistance to anticancer drugs such as Doxorubicin (DOX) and serves as a key target in cancer treatment. Since the peritumoral pH is highly heterogeneous in spatial distribution and not completely overlapped with tumor margin, imaging of acidic tumor environment (TAM) at high spatial resolution and high contrast is critical to fundamental understandings of cancer invasion, predication of cancer development and evaluation therapeutic effectiveness but remains a long-term challenge even in preclinical small animal cancer imaging. Our goal is to develop a tiny renal clearable pH indicator with synergetic pH responses that allow low-cost and high-sensitivity fluorescence imaging techniques to report the TAM's pH gradients at high contrast and high spatial resolution. Achieving this goal will enable fluorescence imaging techniques to serve as a powerful tool in unraveling TAM's critical roles in cancer biology and more efficiently measuring in vivo therapeutic effectiveness of different drugs at lower costs, which are expected to further accelerate anticancer drug discoveries.