

AbstractID: 2547 Title: Superparamagnetic Nanoparticles for Brain Tumor Diagnosis and Therapeutics

Gliomas are currently the most common and lethal type of primary brain tumor. Treating malignant gliomas remains a formidable challenge due to the difficulty in differentiating between tumor and healthy brain tissue, the rapid growth rate of invasive gliomas, intrinsic cellular resistance of gliomas to drugs, and the blood brain barrier (BBB) preventing the passage of drugs and contrast agents. My talk will describe our recent work in the development of a multifunctional nanoprobe for targeting glioma tumors by conjugating iron oxide nanoparticles with a glioma tumor targeting molecule and a near infrared fluorescing (NIRF) molecule. The nanoprobe is detectable by both magnetic resonance imaging and fluorescence microscopy, and exhibits significant targeting capability to glioma cells and effective inhibition to glioma cell migration. Our results demonstrate a cellular-level resolution that may promise accurate delineation of otherwise poorly defined glioma interfaces resulting from their highly invasive morphology. The application of the nanoprobe for preoperative and postoperative diagnostic imaging with MRI and the real-time intraoperative visualization of tumor margins with optical devices is a novel approach to improve the effectiveness of diagnostic and therapeutic modalities available for brain tumor patients.