



BIOEN 509 – DEPARTMENTAL SEMINAR SERIES

Thursday, May 27th 2010, 12:30-1:20 PM

Foege Bioengineering Building N130A

Multifunctional Nanoparticles for Cancer Diagnosis and Therapy

Dr. Miqin Zhang

Professor, Department of Materials Science and Engineering, UW

Abstract: Treating malignant brain tumors remains a formidable challenge due to the difficulty in differentiating between tumors and healthy brain tissue, intrinsic cellular resistance of tumors to drugs, and the blood brain barrier (BBB) preventing the passage of drugs and contrast agents. Targeted delivery of contrast agents and therapeutic payloads using nanoparticles is a promising approach that may overcome these barriers. Our research aims to develop multifunctional nanoparticle systems that can serve as imaging markers, targeting agents, and drug delivery vehicles for non-invasive diagnosis, treatment, and therapy-response monitoring of brain cancers. In the past few years, we have developed several multifunctional nanoparticle systems that demonstrate an ability to specifically target brain tumors across the BBB, and exhibit innocuous toxicity profiles and sustained retention in tumors, as established through uptake assays, in vivo magnetic resonance and biophotonic imaging, and histological and biodistribution analyses. A typical multifunctional nanoparticle system in our design comprises a superparamagnetic iron oxide core that enables magnetic resonance imaging, a biodegradable polymeric shell that stabilizes the nanoparticle and provides functional groups for biomolecule conjugation, and a targeting ligand for specific binding of target cells. My talk will focus on our recent research in development of nanoparticle systems, including design and characterization of these nanoparticle systems, and their in vitro and in vivo performance.

Dr. Miqin Zhang received her Ph.D. degree in Materials Science and Engineering from UC Berkeley in 1999, and joined the faculty of University of Washington after her graduation. She is currently a Professor in the Department of Materials Science and Engineering at the University of Washington and an Adjunct Professor in the Departments of Radiology, Neurological Surgery, and Orthopedics & Sports Medicine, UW School of Medicine. Dr. Zhang's research focuses on several aspects of biomaterials and biodevice development, including: nanomaterials for controlled drug delivery, cancer diagnosis and therapy; biocompatible and biodegradable composite scaffolds for tissue engineering and regenerative medicine; and biosensors for anti-cancer drug screening and toxin detection. In the past few years, her research group has developed several multi-functional nanoparticle systems for MR imaging, chemotherapy and gene delivery. Her research on nanomedicine has been highlighted in The Wall Street Journal, MIT Technology Review, National Geographic News, etc.



For more information please visit <http://courses.washington.edu/bioetalk>