RICE
Department of Bioengineering

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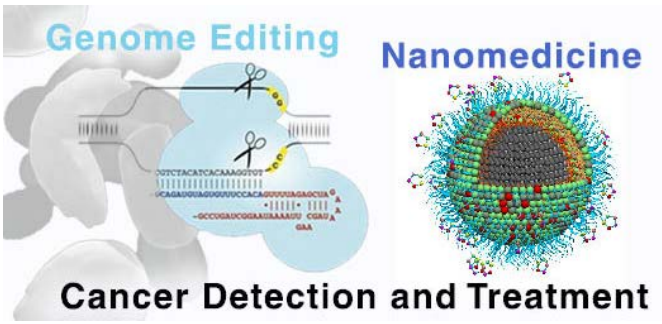
Laboratory of Biomolecular Engineering and Nanomedicine

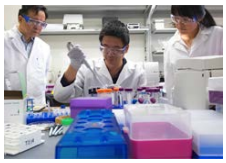


Bio Sketch

Sheng Tong develops nanotechnologies for the early detection and treatment of atherosclerosis, cancer and many other human diseases. Currently, his research in Professor Bao's Laboratory of Biomolecular Engineering and Nanomedicine focuses on the development of functional iron oxide nanoparticles, a versatile nanomaterial that can be used for in vitro diagnostics, magnetic resonance imaging, drug delivery and remote control of biological processes.

Iron oxide nanoparticles (IONPs) are composed of wüstite,

maghemite or magnetite crystals only a few nanometers in diameter. In particular, magnetic iron oxide nanoparticles (MNPs) of maghemite or magnetite can produce strong T2 signals in magnetic resonance imaging, holding great promises for molecular imaging of various disease processes. MNPs can be heated with alternating magnetic field (AMF). This feature has been extensively explored for cancer hyperthermia and controlled drug release. In addition, as with bulk magnets, MNPs experience a force in external magnetic field. These nano-sized magnets thus provide a means for magnetic targeting of therapeutic agents to desired organs or tissues in the body.



Education

Postdoctoral Fellow, Biomedical Engineering, University of California at San Diego (2003-2006)

Ph.D., Biomedical Engineering, Duke University (2003)

M.S.,

Working in the Bao lab, Tong's research covers chemical synthesis, fundamental biophysics and biomedical applications of MNPs. Tong has developed novel methods for coating MNPs with lipids and lipid-PEG copolymers. The packaged MNPs were used as model systems for elucidating the mechanisms of MRI T2 relaxivity, AMF heating and magnetic mobility. Combining these nanotechnologies, Tong is working toward using MNPs to improve intratumoral delivery of therapeutic agents. Examples include loading MNPs with doxorubicin for combined hyperthermia and chemotherapy, or indocyanine green for image-guided photothermal therapy. Tong also works with biologists and medical doctors to engineer MNPs for monitoring and controlling cell fate in cell therapies.

Prior to his research at Rice University, Tong was a research engineer in the Wallace H. Coulter Department of Biomedical Engineering at Georgia Institute of Technology. His

Mechanical Engineering, Peking University (1998)

B.S., Mechanical Engineering, University of Science and Technology of China (1995)

investigations in the NIH/NHLBI Program of Excellence in Nanotechnology served the Center for Translational Cardiovascular Nanomedicine.

Tong has a doctorate degree from Duke University where he worked in Professor Fan Yuan's research group. The research investigated mechanisms of molecular transport in tissues, and the transport barriers of drug delivery to solid tumors.