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Host: Thomas Webster
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"Mitochondria-targeted Delivery Systems"

Wednesday, August 6
325 Shilllman Hall
11:45 a.m. – 1:00 p.m.

Refreshments will be served

ABSTRACT Potential benefits of integrating nanomaterials with properties such as biodegradability, magnetization, fluorescence, and near-infrared absorption into a single object of nanoscale dimensions can lead to the development of hybrid nanocarrier platforms for simultaneous targeting, imaging, and combination therapy administration. We are developing hybrid nanoparticle (NP) systems for their potential use in organelle targeting, combination therapy of cancer, and image-guided therapy of atherothrombotic vascular diseases. Mitochondrial dysfunctions cause many human disorders. A platform technology for carrying bioactive molecules to different mitochondrial compartments could be of enormous potential benefit in medicine. We are developing rationally designed, programmable NP platform for diagnosis and targeted delivery of therapeutics for mitochondrial dysfunction related diseases. An optimized formulation for maximal mitochondrial uptake was identified through in vitro screening of a library of charge and size varied NPs and the uptake was studied by qualitative and quantitative investigations of cytosolic and mitochondrial fractions of cells treated with mitochondria-targeted blended NPs. The versatility of this platform was demonstrated by studying a variety of mitochondria-acting therapeutics for different applications. These include mitochondria targeting chemotherapeutics for cancer, mitochondrial antioxidant for disease of central nervous system, and mitochondrial uncoupler for obesity. On the cardiovascular front, we are developing a long-circulating hybrid NP platform to selectively target macrophages and sense apoptosis for detection of plaque vulnerable to embolism.

BIOGRAPHY Dr. Shanta Dhar was born in West Bengal, India. She received her Ph.D. from the Indian Institute of Science, Bangalore, India. Her graduate work was in the area of bioinorganic chemistry with the overall goal to develop copper (II) complexes to effect photocleavage of double stranded DNA at longer wavelengths. She was awarded with Prof. S. Sunderajan Best thesis award, Indian Institute of Science (2005). In 2006, she came to this side of the globe and joined Johns Hopkins University as a postdoctoral fellow where she worked in the area of bioorganic chemistry with Prof. Marc M. Greenberg. During 2007-2010, Dr. Dhar was an Anna Fuller postdoctoral fellow in Prof. Stephen J. Lippard's group at the Massachusetts Institute of Technology and her postdoctoral studies were focused on nanocarrier-mediated delivery of platinum-based drugs for their potential applications in cancer. Dr. Dhar joined the chemistry department at the University of Georgia as an assistant professor in August 2010. Dr. Dhar's research interests focus on nanomedicine with particular interests in mitochondrial-dysfunction related diseases. She has published over 41 peer-reviewed articles and holds 10 patents on these topics. She has received Ralph E Powe junior faculty award (2011), Department of Defense Prostate Cancer Idea Development award (2012), Targeting Mitochondria 2012 Award for Scientific Contribution, American Heart Association Scientist Development award 2013, Georgia's Top biomedical researcher 2014.