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Nano-sensors for apoptosis detection in Atherosclerotic Plaques

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Cardiovascular diseases, including hypertension, coronary heart disease, stroke, congenital cardiovascular defects, congestive heart failure, and peripheral vascular disease, is the leading cause of morbidity and mortality in the industrialized world. These conditions affect more than 60 million people and are responsible for the death of almost 1 million Americans per year. Imaging represents an important component of the diagnosis and evaluation of cardiovascular disease. Modalities to image the heart and vasculature include radiography, echocardiography, nuclear imaging, cineangiography, and computed tomography. Magnetic resonance imaging (MRI) has recently emerged as a growing means of cardiovascular imaging. The goal of our work is to develop an advanced MRI active nanoparticle (NP) platform with an excellent pharmacokinetic (PK) profile and plaque targeting properties to allow apoptosis sensing in atherosclerosis and locally release therapy. Conventional statin therapies show residual risk of coronary artery disease. Development of cardiovascular sensing and treatment strategies has stagnated in recent years. This can be ascribed to limited improvements in targeting and discriminating between atherosclerotic lesions and establishing robust endpoints for a given sensing is difficult due to the complex vasculature network. Our approach have potential in visualizing, quantifying, and characterizing atherosclerosis, and can be used to determine valid endpoints to address the current limitations. This MRI active NP platform specifically designed for atherosclerosis, when shown effective, can be used as the basis for novel therapeutics for their clinical transition. This talk will be focused to summarize some of our preliminary results based on nanotechnologies for cardiovascular diagnosis and therapy.

Biography

Dhar received her Ph. D. from the Indian Institute of Science, India. She was a postdoc in JHU where she developed sensors for detection of DNA lesions. In 2007, she joined MIT as an Anna Fuller fellow and worked on platinum-based cancer therapy. Currently, Dr. Dhar is an assistant professor in the chemistry department at the University of Georgia and an adjunct assistant professor in the Department of Physiology and Pharmacology. Her research program is in the field of nanomedicine. Dhar was recently awarded with Ralph E. Powe Junior Faculty Enhancement Award and Department of Defense Idea award.

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