Shape Controlled Iron Oxide Nanoparticles for Simultaneous Imaging and Therapy of Brain Tumors

Jennifer Sherwood
Chemical and Biological Engineering
Advisor: Dr. Yuping Bao

ABSTRACT
Iron oxide nanoparticles (NPs) have been widely and actively explored in biomedical fields because of their great biocompatibility and tunable magnetic properties. Many applications are pursued, including targeted drug delivery and localized therapy. In particular, sugar coated iron oxide nanoparticles have been clinically used as magnetic resonance imaging (MRI) contrast agents. NPs are generally administrated intravenously, leading to direct interaction with the human body’s immune system. Protein absorption and non-specific binding to the NP surfaces in vivo may trigger an undesirable immune response and further affect the targeting efficiency. Therefore, the surface of the nanoparticles is critically important for exploring the biomedical application of iron oxide nanoparticles. In addition to the surface, the shapes of the nanoparticles also directly affect the cellular uptake and blood circulation time. In this presentation, a systematic overview of the surface and shape effects on the biological response of cells will be presented. Subsequently, a detailed research plan will be proposed.

BIOGRAPHY
Jennifer Sherwood was born in Sierra Vista, Arizona. She completed her undergraduate degree in chemical engineering at Arizona State University in Tempe. During her time at ASU, Jennifer participated in a research experience for undergraduates, which brought her to the University of Alabama. Jennifer continued her project for two additional summers working under the advisement of Dr. Yuping Bao. Upon completion of her undergraduate degree, she then decided to continue with her research and attend the University of Alabama in pursuit of her PhD.