Location:
Room 101, Center for High Technology Materials (CHTM)
1313 Goddard SE
SW corner of UNM’s Science and Technology Park

Monday, 9 Feb. 2009, 2:30 pm

Speaker: Michaelann S. Tartis
Assistant Professor of Chemical Engineering, New Mexico Tech

Targeted Drug Delivery with Ultrasound and Microbubbles

Combining extracorporeal ultrasound forces and novel vehicles to enhance drug delivery at a target site provides a unique opportunity to deliver chemotherapy to cancerous tumors, while decreasing the toxic effects to healthy tissue. Ultrasonic and molecular mechanisms provide synergistic means to spatially limit drug deposition. Vehicles called acoustically active lipospheres (AAL) were designed to incorporate three components: a non-toxic oil carrying the hydrophobic drug paclitaxel; a targeting peptide conjugated to the AAL surface; and a gas core that allows acoustic manipulation, i.e. radiation force and fragmentation. A unique pulse sequence was designed to achieve spatially limited delivery with these vehicles. In this sequence, ultrasound radiation force pulses displace the drug-containing vehicles to the endothelium, while subsequent fragmentation pulses rupture the vehicles, leaving behind small drug-containing fragments anchored to the cell surface by targeting ligands.

This drug delivery pulse sequence increased the deposition of a fluorescent molecule on cell surfaces by more than 10x over no ultrasound or fragmentation pulses alone.