“Plasmon Resonant Liposomes as a Targeted, Controlled-Release Drug Delivery System”

Abstract: For many types of cancers chemotherapy is the treatment of choice despite evidence that this treatment modality is contributing just about 2% to 5-year survival in all types of cancers. One of the main disadvantages of the use of chemotherapy is that it is administered throughout the entire body, which accounts for the associated side effects of cancer treatment. Drug delivery systems (DDS) are a safe and reliable method of getting drugs to a disease site. They can effectively protect the healthy areas of the body from the adverse effects of the drug while also preventing the degradation of the drug, due to enzymatic action, within the body.

The Food and Drug Administration (FDA)-approved DDSs, such as Doxil, a liposomal formulation of doxorubicin, have been introduced to clinical practice to limit systemic exposure to such drugs and thereby reduce related toxicities. However, one of the main challenges that this, and many other drug delivery systems face, is the ability to successfully release content on demand at the target site. This work is focused on the optimization of a liposomal drug delivery system. This was done by harnessing both the plasmon resonant capabilities of gold nanoparticles as well as the ability to use ligands as a mechanism to target specific cancers.

We introduced liposome-supported plasmon resonant gold nanoshells, a DDS that works on the premise of the conversion of light energy to heat that in turn initiates drug leakage from the liposome core. This dissertation is focused on building upon this observed phenomenon to address the need for a drug delivery system that is targeted specifically to diseased sites and is also capable of releasing content on demand.

Wednesday, April 25th, 2018
Medical Research Building 102
Noon
Host: Marek Romanowski, PhD

Persons with a disability may request a reasonable accommodation by contacting the Disability Resource Center at 621-3268 (V/TTY).