Amgen Seminar Series in Chemical Engineering

in

Cherry Auditorium, Kirk Hall, 1 PM

Presents on April 22, 2010

Self-Assembled Nano-Liposomes as Diagnostic/Therapeutic Carriers

By

Dr. Mu-Ping Nieh
Canadian Neutron Beam Centre
National Research Council of Canada

Unilamellar liposomes have been commercialized as carriers for pharmaceuticals and imaging contrast agents. Traditional manufacturing methods of small uniform (~50 nm) unilamellar liposomes usually involves labour-intensive multi-stage extrusion, where filter rupture and fouling can be problematic, resulting in production delays and elevated monetary costs. Our recent research on spontaneously formed unilamellar liposomes from lipid mixtures composed of a short-chain and a long-chain phospholipid, and slightly doped with a charged lipid has resolved many of the issues associated with extruded liposomes. Firstly, these liposomes consistently self-assembly and are extremely stable. Moreover, the average diameter of the self-assembled liposomes can be as small as 20 nm with a narrow size distribution (i.e., polydispersity ~ 20%). These liposomes have also been shown to release their contents as a function of temperature, a useful characteristic when it comes to the delivery of therapeutics. One of our preliminary *in vivo* studies has shown that such functionalized liposomes preferentially targeted tumours in an animal model. Using small angle neutron scattering, we have successfully investigated the formation mechanism of self-assembled liposomes not only to gain a deeper understanding of colloidal systems in general, but also to better control their final size, which can be altered depending on their applications.

This series at the University of Rhode Island is made possible through the generosity of Amgen, West Greenwich, R.I.