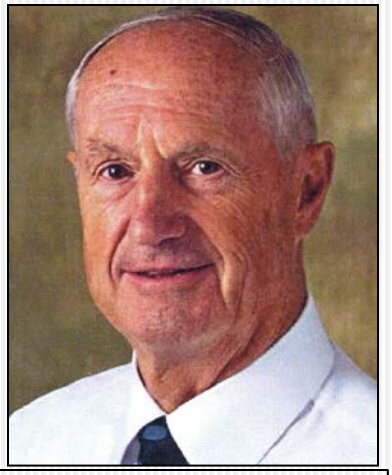
"Colloids for Medical Therapy : Chemical Overdose Application"

ORGANIC SEMINAR
Friday,
November 6th, 2015
9:00 a.m.

Hutchison Hall 473
University of Rochester
Department of Chemistry



Guest Speaker:
Professor Richard E. Partch
Clarkson University
Department of Chemistry

Abstract: Patient overdoses of therapeutics given by physicians or taken by prescription, as well as unwise human use of illicit drugs is widespread and results in many thousands of deaths each year. Liver and heart failure are the most often diagnosed problems. Commencing in 2003 the presenter with Anesthesiologists Dennis and Morey at the University of Florida considered two methods by which nanoparticles having potential as biocompatible and injectable antidotes for several molecular types of the culprit toxins could be prepared and evaluated. Microemulsions and surface functionalized nanoparticles have proven useful in preliminary, detailed evaluations.

Microemulsions composed of ~30nm oil droplets stabilized by Pluronic and fatty acid surfactants are able to remove large amounts of exemplary overdosed bupivacaine anesthetic, amitriptyline antidepressant and cocaine *in vivo* in rat tests, thus returning QRS heart beat intervals to near normal within 30 minutes. Continuing research by the presenter and coauthors since 2008 has established the ability of microemulsion oil droplets using two different oils to absorb a wider variety of chemicals effecting skin and internal organs.

Nanoparticles covalently functionalized with electron deficient "pi acceptor" aromatic rings exhibit strong binding to overdosed chemicals having "pi donor" aromatic rings as part of their structure. This "pi-pi complexation" chemistry exists for many common culprit molecules as detected by nuclear magnetic resonance spectroscopy, effectively deactivates their biological action, and for particles less than 10nm diameter the toxins can be discharged through urination.

This presentation will summarize ongoing research on how the microemulsions and functionalized nanoparticles may serve as future antidotes for some overdosed chemicals.

Host: Professor Robert Boeckman, email: rkb@rkbmac.chem.rochester.edu