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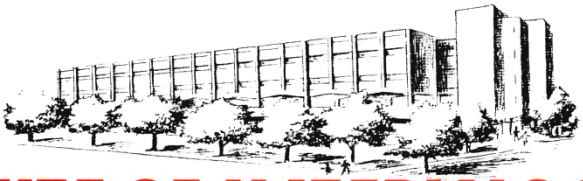

INSTITUTE OF MATERIALS SCIENCE

POLYMER PROGRAM SEMINAR

"Targeted polymeric nanoparticles: From discovery to clinical trials"

Dr. Omid C. Farokhzad
Brigham and Women's Hospital &
Harvard Medical School

Friday, Feb. 14, 2014
1:30 PM, IMS Room 20

A variety of organic and inorganic materials have been utilized to generate nanoparticles for drug delivery applications, including polymeric nanoparticles, dendrimers, nanoshells, liposomes, nucleic acid based nanoparticles, magnetic nanoparticles, and virus nanoparticles. Most commonly used systems are polymeric nanoparticles and liposomes. Controlled release polymer technology impacts every branch of medicine. Polymeric nanoparticles can deliver drugs in the optimum dosage over time, thus increasing the efficacy of the drug, maximizing patient compliance and enhancing the ability to use highly toxic, poorly soluble, or relatively unstable drugs, and can also be used to co-deliver two or more drugs for combination therapy. The surface engineering of these nanoparticles may yield them "stealth" to prolong their residence in blood and the functionalization of these particles with targeting ligands can differentially target their delivery or uptake by a subset of cells, further increasing their specificity and efficacy. The successful clinical translation of therapeutic nanoparticles requires optimization of many distinct parameters including: variation in the composition of the carrier system, drug loading efficiency, surface hydrophilicity, surface charge, particle size, density of possible ligands for targeting, etc., resulting in potential variables for optimization which is impractical to achieve using a low throughput approach. Combinatorial approaches precisely engineer nanoparticles and screen multiple nanoparticle characteristics simultaneously with the goal of identifying formulations with the desired physical and biochemical properties for each specific application. This review demonstrates our efforts in the design and optimization of polymeric nanoparticles for medical applications, which formed the foundation for the clinical translation of the first-in-human targeted and controlled-release nanoparticles, BIND-014 and SEL-068.

**For further information, please contact YH Chudy at ychudy@ims.uconn.edu*

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