

**Amgen Seminar Series in Chemical Engineering**  
in  
Cherry Auditorium, Kirk Hall, 1 PM

**Presents on April 2, 2015**

**PEGylated poly(amino acid)s – A Platform for Biomedical Polymers**

**Or: How to make things invisible**

By

Dr. Carmen Scholtz  
Department of Chemistry  
University of Alabama in Huntsville

Poly(ethylene glycol), PEG, is an established biopolymer that is in clinical use for several decades. It biocompatibilizes substrates by conveying invisibility or a “stealth character”, meaning the PEGylated substrate is not readily recognizable by the reticuloendothelial system. PEGylated drugs have a prolonged circulation time in the blood stream, and are therefore available to the system for a longer period of time. PEGylated gene delivery systems not only have a longer circulation time, but PEGylation makes the delivery system available for cell absorption by extravasation. PEGylated surfaces become “invisible” to the proteins that typically adhere to surfaces and that start the cascade of undesirable cell adhesion on foreign (implanted) objects or devices. However, PEG is chemically inert and therefore cannot be readily attached to a substrate; PEG needs to be modified with a reactive handle.

By forming block copolymers with a poly(amino acid), PAA, the chemical inertness of PEG is addressed as the PAA blocks act as anchoring moiety for the PEG-*b*-PAA copolymer. Amino-terminated PEG is used as macroinitiator in the ring-opening polymerization of *N*-carboxyanhydrides of natural amino acids. The PAA block in itself is also biocompatible as it is formed from naturally occurring amino acids. A variety of chemical architectures will be discussed: If the functional groups of the amino acids are reactive towards the surface of a substrate, the copolymer is useful for surface modifications, thereby making devices “invisible”. If the PAA-block is hydrophobic, the resulting block copolymers will self-assemble to form drug or gene delivery vehicles.

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

Refreshments provided by the Joseph Estrin Endowment.