Solvay Seminars in Macromolecular Science & Engineering

Macromolecules Innovation Institute (MII)

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Prof. Kathryn E. Uhrich

"Polymeric Bioactives: Polymers from Bioactives and as Bioactives"

University of California, Riverside

Dean, College of Natural & Agricultural Sciences
Professor, Department of Chemistry

Host: John Matson

Abstract: Our research centers on centers on polymeric bioactives; specifically, the design of biocompatible, biodegradable polymers that will improve humanhealth. Given that our starting materials are naturally occurring and our polymeric bioactives safe; moreover, we incorporate green chemistry approaches to the polymer life- cycle. We have two different classes of polymers - polymers that deliver bioactives and polymers derived from bioactives. As polymers that deliver bioactives, nanoscale amphiphilic macromolecules (AMs) were initially created to encapsulate hydrophobic drugs and improve drug water- solubility and improve bioavailability. Our current work builds upon the discovery that the demonstrated that the AMs themselves are bioactive – they actively coordinate with binding domains on macrophages to mitigate formation of atherosclerotic plaques. They also display novel mechanisms for mitigating biofilm formation. As polymers derived from bioactives, PolyActives are designed to biodegrade into therapeutically useful or bioactive molecules. The first example was a poly(anhydride-esters) that yielded salicylic acid, the active component of aspirin. This concept has been expanded to include PolyAntibiotics, PolyAntiseptics and PolyOpiates useful for localized, controlled bioactive delivery for pharmaceutical, personal care, and commercial applications.

Bio: Dr. Kathryn Uhrich is currently Dean of the College of Natural and Agricultural Sciences as well as Professor of Chemistry at University of California, Riverside. She earned a Ph.D. in Organic Chemistry from Cornell University, and her BS in Chemistry, with honors, from the University of North Dakota. Dr. Uhrich's research links chemistry with the life sciences and engineering disciplines to create new materials and design new devices in which polymers can be used to increase health and extend life. Widely recognized

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Bio (cont.): as a leading innovator in polymer research, her research focuses on designing bioactive, biodegradable polymers for use in drug delivery, food safety, and personal care. Dr. Uhrich has been issued more than 70 U.S. and international patents, and her work has spawned several start-up companies. She has also collaborated extensively with colleagues in this country and overseas, and worked in close partnership with companies such as Chanel, DuPont, Exxon Mobil, Johnson & Johnson, and Merck. Dr. Uhrich's innovative research in polymer chemistry and biomaterials has trained nearly 200 undergraduate, graduate,and high school students, as well as postdoctoral scientists. Prior to UCR, Dr. Uhirch served as Dean of Mathematical and Physical Sciences at Rutgers, was recently inducted into the National Academy of Inventors, and named a Fellow of the American Chemical Society.

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