UCLA Engineering
HENRY SAMUELI SCHOOL OF
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# BIOENGINEERING

PRESENTS

## PolyActives and Sugar-based Amphiphiles that are Biodegradable and Biocompatible

THURSDAY, Dec 5, 2019
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2101 ENGINEERING V


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**ABSTRACT:**

While polymeric bioactives were initially designed for delivering pharmaceuticals, the concept has been expanded beyond medical uses to improved lubricity of engine oils, prevention of plaque buildup on tooth enamel, and improved skin appearance. To design biocompatible and biodegradable polymers, we begin with starting materials that are naturally occurring and deemed safe. We have two different classes of polymers – sugar-based amphiphiles that deliver bioactives and polymers derived from bioactives (PolyActives).

As polymers that deliver bioactives, nanoscale sugar-based amphiphiles 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 sugar-based amphiphiles 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


**BIOGRAPHY:**

Dr. Kathryn Uhrich is Dean of the College of Natural and Agricultural Sciences and Professor of Chemistry at University of California, Riverside. She received her BS degree from the University of North Dakota, PhD degree from Cornell University and then held post-doctoral positions at AT&T Bell Laboratories and Massachusetts Institute of Technology. Dr. Uhrich began her academic career at Rutgers University with a research program centering on biodegradable and biocompatible polymers. Her research accomplishments have been disseminated in hundreds of publications, as well as tens of millions of dollars in grant funding, multiple industrial collaborations, hundreds of patents/filings, and several start-up companies. 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 in her lab. Dr. Uhrich also served as Dean of Mathematical and Physical Sciences at Rutgers, was inducted into the National Academy of Inventors. She is a Fellow of the American Chemical Society, the Chemical Release Society, and the National Academy of Inventors of the U. S. Patent and Trademark Office. She serves as editor-in-chief of the Journal of Bioactive and Compatible Polymers.