

# **Biomacromolecule Delivery Strategies for Treatment of Bacterial and Viral Infections**

Jill Steinbach-Rankins

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The challenge of treating diseases with drugs often comes down to the method of delivery. These delivery vehicles must be designed to take into account the complex and differing physical, chemical and biological environments found throughout the body, organs, bloodstream and even individual cells and subcellular compartments. My laboratory extensively develops soft material systems and nanomaterials for these complex environments. Specific delivery vehicles include 3D-bioprinted and fiber-based scaffolds that incorporate probiotics, custom designed polymeric nanoparticles, and polymer-nanoparticle composite fibers. Our studies on the effectiveness of delivery have led to an improved understanding of the relationships that govern transport to and interactions with the infections. This talk will provide an overview of these controlling principles, which can be widely applied to drug delivery problems, and other applications as well; e.g., synthesis of composite materials, chemically responsive materials, sensors and actuators, and deposition and coatings. This talk will illustrate these principles with several examples from my research. In line with this workshop format, I would welcome any discussion on ways these materials and principles might be applied to your research studies.



**Jill Steinbach-Rankins**, Associate Professor of Bioengineering, University of Louisville, received the Ph.D. in Bioengineering from Arizona State University, and B.S. and M.S. degrees in Materials Science Engineering from the University of Illinois (UIUC) and Arizona State University, respectively. She was a Postdoctoral Scholar at Yale University prior to joining UofL in 2013. At UofL she holds an appointment in the Center for Predictive Medicine, with associate faculty appointments in the Departments of Pharmacology & Toxicology and Microbiology & Immunology. Her research studies focus on designing biomacromolecules, gene and drug delivery vehicles for treatment of various diseases, including sexually transmitted infections (STIs) and various cancer. Professor Steinbach-Rankins recently was awarded an NIH R01 grant in support of these studies.

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