

CHEMICAL ENGINEERING

DISTINGUISHED YOUNG SCHOLARS SERIES



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MIT

Interfacing Cells and Materials for Advanced Delivery Systems

ABSTRACT: The clinical translation of therapeutics, both synthetic and biological, is often limited by their poor biological performance. While synthetic delivery systems (e.g. nanoparticles) are well-suited for therapeutic loading and controlled release, they struggle to navigate through the circulatory system, target specific tissues, and breach biological barriers as effectively as natural cells. Therapies utilizing natural cells have evolved to perform biological functions, but they lack the controlled release advantages of synthetic systems. My talk will focus on methods I have developed to interface cells and synthetic materials to take advantage of both of their respective strengths. First, I will discuss a strategy known as "cellular hitchhiking", which involves the attachment of polymeric particles to the surface of circulatory cells so as to transfer innate circulatory (e.g. erythrocyte's long circulation) and targeting abilities (e.g. leukocyte's inflammation targeting) from cell to particle. The second part of my talk focuses on modifying therapeutic cells with synthetic polymers to improve the delivery of cell-therapeutics for enhanced host integration and function; specifically, improving the delivery of probiotics to the microbiome. The final part of my talk brings these two ideas together to highlight the design, synthesis, and application of a synthetic cell, specifically a synthetic platelet capable of performing hemostasis, by leveraging my fundamental findings of cell-material interactions.

LECTURE 4:00 - 5:00 (PAA) A110
Happy Hour in Benson Hall Lobby Following



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BIOGRAPHY: Dr. Aaron C. Anselmo is a Postdoctoral Associate at the Massachusetts Institute of Technology. Working in the laboratory of Institute Professor Robert Langer, his research is addressing challenges that limit the integration of probiotic systems into the gastrointestinal microbiome. He obtained his B.S. degree in Chemical Engineering from Rensselaer Polytechnic Institute, and a Ph.D. in Chemical Engineering from the University of California, Santa Barbara. At the University of California, Santa Barbara, Dr. Anselmo worked under the supervision of Professor Samir Mitragotri as an NSF GRFP Fellow and contributed to more than 25 peer-reviewed research publications in the field of drug delivery.