

Biopharmaceutical Discovery Faculty Search Candidate Seminar

219 Brown Laboratory
February 3, 10AM

Uncovering Epithelial Organizing Principles with Synthetic Biomimetic Structures



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Epithelial cells accomplish a number of remarkable feats in the human body through chemically rich membrane structures. Epithelial membranes help protect the body from pathogens, they help form the complex shapes of organs, and they help excrete waste and take up nutrients necessary for homeostasis and survival. Many of these functions are so central to normal physiology that when disrupted lead directly to disease, such as cancer and transport disorders. Yet, how membrane structures – membrane proteins and glycans, in particular – mechanistically execute many of the varied functions of epithelial tissue remains unresolved. To overcome the challenges associated with such a complex biochemical environment, I've developed a number of synthetic tools that control membrane composition with molecular precision. In this talk, I will discuss two discoveries in epithelial biology enabled by biomimetic structures. In the first part of the talk, I will describe how membrane glycans control mammary gland morphogenesis and tumorigenesis, and in the second part of the talk, I will detail the discovery of a biochemical complex that sets epithelial tissue permeability. Findings from each of these projects have led to new therapeutic strategies, several of which I will highlight throughout the talk.



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