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Pharmaceutical Sciences Seminar

Wednesday, February 3, 2021
4:00 PM

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"Delivery Strategies for Microbe Therapeutics"

Presented by:

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Abstract: Live biotherapeutic products (LBPs) are an emerging class of FDA-regulated drugs that include microbiota transplants, spore-based therapeutics, probiotics, and genetically engineered microbes that secrete drugs. In the majority of clinical examples, LBPs are being used as curative treatments for diseases that are associated with dysbiosis, or an imbalance in protective versus harmful species within the microbiome. In this case, LBPs can initiate microbiome modulation from a dysbiotic state to a protective or therapeutic state. A separate class of LBPs are genetically engineered to secrete drugs or biologics for local delivery as patient-friendly alternatives to injectable dosage forms or other routes of administration that suffer from compliance/convenience burdens. Broadly, LBPs are used for different diseases, on different tissues, and for different mechanisms of action; as with all therapeutics, delivery of the appropriate dose (concentration) at the right place (location) for a sufficient amount of time (duration) governs toxicity, side effects, and efficacy. My presentation will focus on describing how we identify important delivery parameters for LBPs and subsequently engineer novel delivery systems to control LBP delivery. Specifically, I will discuss a surface modification approach that my lab has developed to enhance the adhesion of LBPs to the gastrointestinal microenvironment, leading to control over LBP delivery at microscopic length scales, extending LBP duration of residence, and influencing the local concentration of LBPs. I will then discuss a film-based polymer encapsulation technology that is compatible with standard oral capsules to facilitate the mucoadhesion and sustained release of LBPs, towards dictating the spatial concentration and contact time of LBPs. In this presentation I will highlight these results and more broadly discuss the potential of applying pharmaceutical, bioengineering, and drug delivery approaches towards improving the delivery of LBPs to the gastrointestinal tract.

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