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TITLE

Drug Delivery Across Mucus Layers: Are We Getting the Whole Picture?

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The thousands of bacteria inhaled daily do not normally constitute a treat because airway surfaces are shielded by a mucus layer composed of long mucin strands bathing in a solution rich in anti-microbial agents, inflammatory cells and mediators. On the other hand, this mucus is a formidable physical barrier for most therapeutic agents delivered to the airways for the treatment of chronic lung diseases. Therefore, strategies are developed to improve the delivery of inhalation therapies. However, chronic lung diseases transform mucus into “sputum” of drastically different chemical properties and composition. The most extreme case is the airways of cystic fibrosis patients, where viscous and adhesive mucus strands are entangled with resilient bacterial colonies shielded by a biofilm. This lecture provides a critical comparison of the tools available on the market, or moving through the pipeline, to improve inhalation drug delivery. While some are designed to raise sputum permeability (i.e. nanotechnology and charge neutralization), others liquefy sputum (i.e. Pulmozyme, SYN01). This lecture emphasizes the importance of designing and testing the efficacy of mucolytics using material collected from the airways of the targeted patient population, instead of artificial or endogenous mucus accumulating on aseptic cultures. Another factor essential to the development of efficient drug delivery systems is to target all major sputum components participating in the barrier effect. At the end of this lecture, the audience will have gained a better understanding of the factors essential to the design of effective drug delivery systems for chronic lung diseases.

Biography

Dr. Maryse Picher is an Advisor Expert on drug discovery for respiratory diseases. For pharmaceutical companies and institutes, she provides guidance on laboratory protocols and clinical trial design. For investment firms and VCs, Dr. Picher evaluates the scientific soundness of drugs selected for clinical trials. As lead investigator, she generated ~ 2 millions in grant funding, published 75 peer-reviewed publications, and gave 35 invited lectures. Her research led to the identification of a new signaling pathway for airway clearance. Dr. Picher is also Editor-in-Chief of a book on drug discovery for Springer (June 2011: <http://dx.doi.org/10.1007/978-94-007-1217-1>), on the editorial board of various journals, including International Journal of COPD and ISRN Pulmonology Journal, and author for the therapist website: PutMeBackTogether.com.