Dry powder inhalable formulations for anti-tubercular therapy

Abstract
Tuberculosis (TB) is an intracellular infectious disease caused by the airborne bacterium, Mycobacterium tuberculosis. Despite considerable research efforts, the treatment of TB continues to be a great challenge in part due to the requirement of prolonged therapy with multiple high-dose drugs and associated side effects. The delivery of pharmacological agents directly to the respiratory system, following the natural route of infection, represents a logical therapeutic approach for treatment or vaccination against TB. Pulmonary delivery is non-invasive, avoids first-pass metabolism in the liver and enables targeting of therapeutic agents to the infection site. Inhaled delivery also potentially reduces the dose requirement and the accompanying side effects. Dry powder is a stable formulation of drug that can be stored without refrigeration compared to liquids and suspensions. The dry powder inhalers are easy to use and suitable for high-dose formulations. This review focuses on the current innovations of inhalable dry powder formulations of drug and vaccine delivery for TB, including the powder production method, preclinical and clinical evaluations of inhaled dry powder over the last decade. Finally, the risks associated with pulmonary therapy are addressed. A novel dry powder formulation with high percentages of respirable particles coupled with a cost effective inhaler device is an appealing platform for TB drug delivery. © 2016.