Pulmonary delivery of anti-inflammatory agents

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Abstract:

Introduction: Respiratory infections and diseases are accompanied by or exhibit inflammation. Recent advances in nanoparticle engineering technology, together with the increased knowledge of inflammatory pathophysiology, have ignited interest in the pulmonary delivery of anti-inflammatory agents (AIAs) to achieve local treatment of pulmonary inflammatory disorders. Areas covered: This review summarizes and discusses the investigated formulation approaches for the pulmonary delivery of AIAs, including: inhalation of actives as suspensions or dry powder formulations, with polymeric micro- and nano-delivery carriers, or within liposomes and lipid nanoparticles. Some recent approaches for targeting AIAs to the pulmonary endothelium have also been reviewed. The discussion focuses on finding out whether the investigated approaches were really able to achieve lung targeting and reduce the side effects associated with the systemic administration of AIAs. Expert opinion: The use of the inhalation route for the pulmonary delivery of AIAs is facing several challenges. Some of the investigated formulation approaches appear to be promising in overcoming these challenges. However, in order to create products that reach patients, more therapeutically oriented studies are still needed to ensure formulation stability, in-vivo sustained release behavior, pulmonary retention, and bypassing lung clearance mechanisms.

Keywords:

anti-inflammatory, inflammation, inhalation, lipid nanocarriers, liposomes, nanoparticles, pulmonary delivery

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