

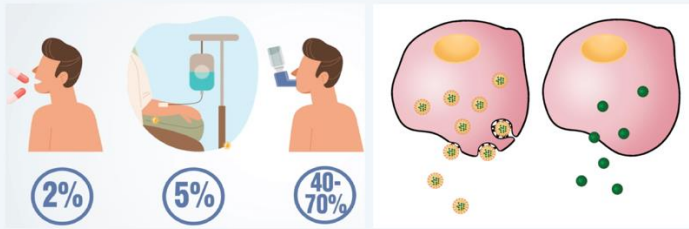
Inhale the Future: Embracing the Next Generation of Inhalable Nanomedicine Technologies Introduction

Unmet Medical Need of Respiratory Diseases



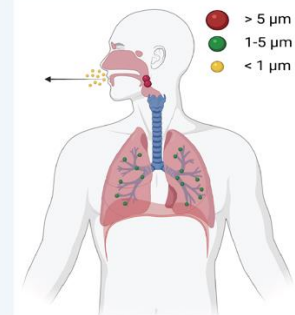
Promises of Inhalable Nanomedicines

- Enhanced drug delivery efficiency into the lungs via inhalation
- Nanotechnology-mediated enhanced treatment efficacy



Challenges in Inhalable Nanomedicine Development & Commercialization

- Nanoparticles **cannot** directly deposit into the lungs due to low inertia
- **Precise particle size control** of aerosols is required for drug delivery into lungs via inhalation

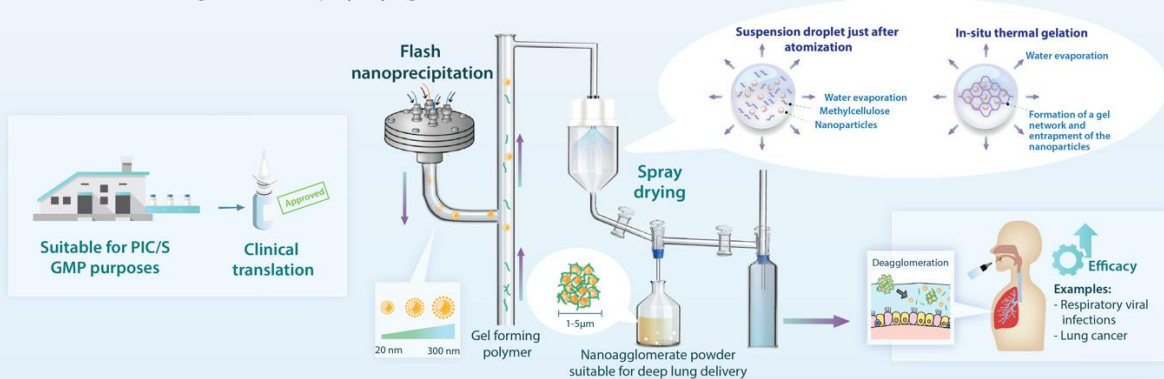


Key Invention Innovations

- A scalable and continuous manufacturing platform for fabricating inhalable nanomedicines
- Tunable particle size for deep lung nanoparticle delivery
- Integration of nanotechnology with inhaled drug delivery for enhanced treatment efficacy against respiratory diseases
- Applicable to patients with varying degrees of pulmonary function impairment (e.g., COPD & lung cancer)

Methodology

A continuous manufacturing platform for inhalable nanoagglomerate powder was developed by integrating flash nanoprecipitation (FNP), in-situ thermal gelation and spray drying.



Applications

The invention has been harnessed to fabricate inhalable paclitaxel and remdesivir nanoagglomerate powders with great therapeutic potential for treating lung cancer and COVID-19. It can expedite the adoption of advanced manufacturing in line with Industry 4.0, accelerating the development of inhalable nanomedicines to address current medical gaps.

Potential Future Applications

The invention can be extended to manufacture nanoagglomerate nasal powders for nose-to-brain delivery of neurotherapeutics (e.g., fingolimod for ischemic stroke).

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Orally Inhalable Paclitaxel Nanoagglomerate Powder for Lung Cancer Treatment

