Dry Powder Micro- and Nano-Carriers for Treatment of Tuberculosis Lung Infections

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Tuberculosis Lung infections

- Mycobacterium Tuberculosis (MTB) infects nearly a third of human population
- 10 million new TB cases each year
- 5% had Multi-Drug Resistant (MDR) TB
  - India has highest MDR cases in world
- Total Drug Resistance (TDR) also reported in India
  - Resistant against all clinically used antibiotics
- Long treatment: 6-12 months
- Macrophages uptake MTB but fail to fuse phagosome with lysosome
- Bacteria resides intracellularly and escapes lethal doses of traditional antibiotic treatment

Dry powder microparticle carrier for phage delivery

- Bacteriophage loaded on particles
- Dry powder formulations
- Deep lung delivery
Overall system

Porous & hollow microparticles

Bacteriophages infecting bacteria
Treatment of MTB lung infections

• Co-delivery of porous and non-porous drug carriers to treat TB

• Effective against sensitive and drug resistant TB and also prevent its spread

• Co-delivering other therapeutic agents, such as endolysins, antibiotics, DNase, small molecule inhibitors, bedaquiline, pulmozyme

• Rapid translation to clinics and high patient compliance with dry powder formulations