

Orphan Medicine / Cancer Treatment: Respiratory Drug Delivery



Avicenna Alliance
Association for Data Driven Medicine

Medical Challenge

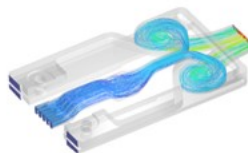
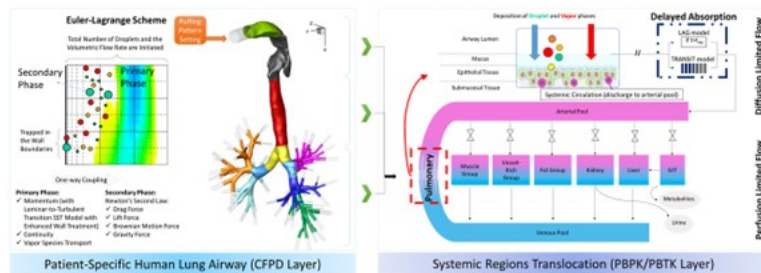
- Optimizing device design for pressure drop and particle size distribution
- Powder dosing/capsule emptying
- Particle de-agglomeration, droplet coalescence
- Device delivery efficiency (particle/droplets deposition)

In Silico Solution

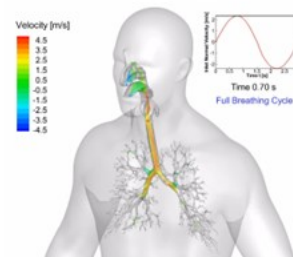
- **Accuracy:** Multiphase flow, steady and transient flow, particle-flow interaction models, particle-particle, and particle-wall interactions

Policy Relevance

- **Understand** impact of inhaler design on performance for patient
- **Predict** powder de-agglomeration efficiency
- Reduced time to market
- Improved reliability



Particles flow through the drug blister of the TWINCER inhaler
Courtesy of University of Groningen



“By increasing the accuracy of delivering chemotherapeutic drug to a lung tumor to 90 percent, versus 20 percent by conventional aerosol methods, they have potentially improved the prognosis for many cancer patients.”

Yu Feng, Assistant Professor
Oklahoma State University Stillwater, USA