"INCREASING THE EFFICIENCY OF AEROSOL DELIVERY" VCU #09-83

Applications

- Increase the efficiency of drug delivery via dry-powder inhalers
- Treatment of respiratory disease, systemic disease, acute pain
- Delivery of next generation medicines (proteins, peptides, nanoparticles)

Advantages

- Allows for delivery of dry powder nanoparticle aerosols directly to the lung
- Targeted delivery to specific areas of the lungs
- Reproducible dosing
- Virtually zero deposition in mouth or throat
- More medication retained in the lungs

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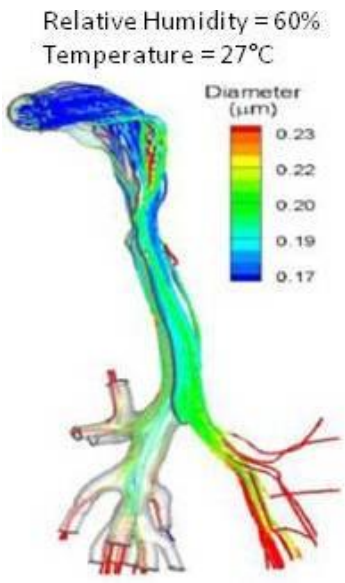
Market Need

Pulmonary drug delivery offers the potential for noninvasive administration of a wide variety of medications. Nearly every biotherapeutic product that treats chronic or long-term illness could benefit from noninvasive delivery. One drawback of pulmonary drug delivery is the inability to control the amount of medication delivered to and absorbed by the lung. Only about 5-20% of the medication is actually delivered to the lung, the remainder is deposited in the mouth and throat and subsequently swallowed. This is tolerable for drugs with high potencies and large therapeutic windows like those to treat asthma, but is a problem for next generation drugs such as peptides, proteins, and genes.

Technology Summary

This is a novel method to increase the water absorbing potential of inhaled nanoparticles and, thereby, ensure proper delivery to the lung. By incorporating a hygroscopic excipient, the drug "grows" as it enters the naturally warm and humid environment of the lung. The result is that the drug is delivered to the lung and cannot be easily exhaled. Moreover, the amount of excipient used can be modified to target the drug to specific regions of the lung. This method greatly enhances the effectiveness of aerosol drug delivery -- deposition is reduced in the mouth/throat and increased in the lung.



Computation fluid dynamic (CFD) models the growth of exicipient coated nanoparticles as they travel from the mouth to the lung.

Technology Status

U.S. patent pending: 13/503,927

This technology is available for licensing to industry for further development and commercialization.