

Team develops inhalers to treat lung diseases

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Dr. Heidi M. Mansour. Credit: University of Arizona

Heidi M. Mansour, PhD, assistant professor in the University of Arizona College of Pharmacy, is working to develop advanced dry powder inhalers to treat and prevent pulmonary diseases.

Dr. Mansour investigates pulmonary states and diseases that have unmet medical needs, including lung transplants, lung cancer, chronic [obstructive pulmonary disease](#), [pulmonary fibrosis](#), bronchiolitis obliterans syndrome, cystic fibrosis, pulmonary infections and [pulmonary hypertension](#). Her goal is to design treatments for these [pulmonary conditions](#) by researching and developing new drugs and by developing the delivery mechanisms for these drugs. Her specialty is [dry powder](#) inhalation aerosols—that is, inhalers.

She recently published a paper in the journal *Expert Opinion on Drug Delivery* titled, "Dry Powder Inhalers in COPD, Lung Inflammation and Pulmonary Infections," detailing this research. The paper discusses currently available dry powder inhalers for inhalable powder drug formulations used in the treatment of COPD, asthma and [pulmonary infections](#).

Delivering drugs to the lungs is the best way to treat many pulmonary diseases, Dr. Mansour said. However, unique challenges and complexities accompany this method of drug delivery.

"The lung is the organ of life that we're targeting, so there are added regulations and added safety limits that we have to work within," Dr. Mansour said. "You're restricted in the volume and mass you can deliver

because you can't block the airways and suffocate the patient. There are added regulations for this class of products within the FDA."

To Dr. Mansour, these challenges are worth the reward of seeing a product help patients live better lives. Her goal for this research is to see these advanced dry powder inhalers end up on pharmacy shelves, remembering that the point of lab research is to have a positive therapeutic effect on people's health while meeting unmet medical needs.

"Our research program integrates fundamental principles of nanotechnology, solid-state particle engineering design, aerosol science, lung biophysics and biomedical drug delivery approaches to the development of aerosol medicine as high-performing multifunctional dry powder inhalers (DPIs) to treat complex [lung](#) conditions for precision pulmonary medicine," she said.

"Our team has been successfully designing and tailoring multifunctional DPIs—novel formulations and inhaler devices—for a number of complex pulmonary diseases that have historically been challenging to effectively treat. Our research lab is one of only a very few labs in the United States that conducts this cutting-edge scientific biomedical research in nanotechnology and multifunctional dry powder inhalers for targeted pulmonary delivery."

More information: Priya Muralidharan et al. Dry powder inhalers in COPD, lung inflammation and pulmonary infections, *Expert Opinion on Drug Delivery* (2014). [DOI: 10.1517/17425247.2015.977783](https://doi.org/10.1517/17425247.2015.977783)

Provided by University of Arizona

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