

New understanding of asthma medicines could improve future treatment

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New research has revealed new insights into common asthma aerosol treatments to aid the drug's future improvements which could benefit hundreds of millions of global sufferers.

Lung diseases such as [asthma](#) are a major global health burden, with an estimated 330 million asthma sufferers worldwide. The most effective treatments are through direct inhalation of medicine to the lungs. However, generating the aerosols for inhalation is a scientific challenge because of our limited knowledge of the microstructure of [drug](#) products before they are aerosolised.

In new research announced today University of Manchester-based scientists demonstrate how they have used X-ray CT scanning to quantify the tiny microstructures of individual particles from the drug product at the nano-scale.

This is the first time that the 3-D microstructure has been revealed and gives scientists and pharmaceutical producers a better understanding of the behaviour of the drug product under aerosolisation.

Lead author of the research, Dr. Parmesh Gajjar said: "We have been able to visualise a drug-blend in 3-D, and see the interplay between drug and non-drug particles in the medicine. This is important for final quality control of asthma medicines to check the actual amount of drug and to help formulate improved asthma medications."

Due to the new technological innovation the findings was initially announced at the Respiratory Drug Delivery (RDD) 2020 conference. The group's work was selected to be a key presentation at the global conference, originally scheduled to take place in Palm Springs but now occurring in a digital format as a result of the global COVID19 pandemic.

The work was made possible through the high-resolution X-ray computed tomography (XCT) instruments in the world leading Henry Moseley X-ray Imaging Facility (HMXIF) at The University of Manchester that provide the capability to analyze a sample at up to 50 nanometers in resolution.

This is particularly important for the inhalation medicines which require aerosolization to generate particles small enough to be adsorb via the lungs. In this project the particles measured less than 5 μm to reach the deepest parts of the lungs.

The paper; 3-D characterization of dry powder inhaler formulations: Developing X-ray micro computed tomography approaches, is published in the *European Journal of Pharmaceutics and Biopharmaceutics*.

More information: P. Gajjar et al. 3D characterisation of dry powder inhaler formulations: Developing X-ray micro computed tomography approaches, *European Journal of Pharmaceutics and Biopharmaceutics* (2020). [DOI: 10.1016/j.ejpb.2020.02.013](https://doi.org/10.1016/j.ejpb.2020.02.013)

Provided by University of Manchester

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