

Biomarker discovery can lead to improved diagnosis and treatment of asthma and COPD

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Rutgers researchers have discovered that people with asthma and chronic obstructive pulmonary disease have a protein in their lungs that leaks a

small molecule into their bloodstream that restricts their breathing instead of relaxing their airways.

The findings, published in the *American Journal of Respiratory Cell and Molecular Biology*, will help clinicians diagnose and determine the severity of chronic lung diseases and make bronchodilators more effective. In the United States, 25 million people suffer with asthma and another 14 million with COPD.

"This protein has been recognized as important in some diseases, but it has never been defined before in airway diseases, such as asthma and COPD, until now," said co-author Reynold Panettieri, vice chancellor of translational medicine at Rutgers. "In addition to identifying this protein, we demonstrated that if you decrease the leakage, the smooth muscles in the airways relax, which could be potentially very important in improving asthma and COPD management. In addition, the presence of too much cAMP in a patient's blood is a new biomarker that can help characterize specific types of asthma and COPD."

The study discovered that a protein in the cell membranes of smooth muscles in the lungs of patients with chronic airway disease can leak [cyclic adenosine monophosphate](#) (cAMP), which transmits biological information to help relax muscles in the lungs and widen the airways. The leakage causes the airways to become constricted and cAMP can be found in the bloodstream, which can improve diagnosis of chronic airway diseases.

Rutgers and Yale School of Medicine researchers collaborated to discover the leak of cAMP from human airway [smooth muscle cells](#) from patients with and without asthma. These cells control constriction of the airways in asthma and by losing cAMP the cells are more apt to constrict and worsen asthma. They next defined cAMP in the bloodstream as a biomarker by analyzing [blood samples](#) from a well-

defined cohort of asthma patients.

"We determined that cAMP blood levels are higher in asthma patients," Panettieri said. "This knowledge allows for better diagnostics of the illness and forms the basis for new therapeutics that will plug the leak of cAMP in the protein."

More information: Gaoyuan Cao et al, Inhibition of ABCC1 Decreases cAMP Egress and Promotes Human Airway Smooth Muscle Cell Relaxation, *American Journal of Respiratory Cell and Molecular Biology* (2021). [DOI: 10.1165/rcmb.2021-0345OC](https://doi.org/10.1165/rcmb.2021-0345OC)

Provided by Rutgers University

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