

# Newly discovered bacterial defence mechanism in the lungs

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A new study from Karolinska Institutet presents a previously unknown immunological mechanism that protects us against bacterial infections in the lungs. The study is being published in the *American Journal of Respiratory and Critical Care Medicine* and shows that healthy lungs contain Interleukin-26, a messenger substance that is further increased by local exposure to a bacterial compound, which in turn increases the mobilisation of anti-bacterial white blood cells. The research team now hope that the discovery will facilitate our understanding of why patients with diseases such as COPD and asthma are more sensitive to bacterial infection than others, and that the discovery also may lead to new and better treatments in the long-term.

Infections in the lungs are common and can cause severe illness and a high mortality rate among patients with chronic [lung](#) diseases. Our knowledge about the immunological mechanisms that normally protect us from [bacterial infection](#) in the lungs is limited. The same applies for the change in these mechanisms that lead to increased sensitivity to bacterial infection in the lungs of patients with Chronic Obstructive Pulmonary Disease (COPD), severe asthma and cystic fibrosis.

In this study, researchers from the Institute of Environmental Medicine, and the Department of Medicine, Solna, together with colleagues at the Sahlgrenska Academy in Gothenburg, have presented a whole new mechanism in the anti-bacterial defence system of human lungs. The mechanism has never previously been seen in any other organ or animal species. It is based on Interleukin-26, a messenger substance that only

exists in higher mammals, which can normally be found and released in high concentrations in the lungs of healthy individuals.

## Triggered in the macrophages

With local exposure of the respiratory tract to endotoxin, a bacterial compound, the extensive production of Interleukin-26 is triggered in the macrophages, a type of white blood cell that is always present and plays a key role in the body's immune defence system. Once released, Interleukin-26 accelerates the recruitment and mobilisation of neutrophils, a type of white blood cell that specialises in attacking bacteria. This occurs both directly and indirectly via special receptors on the neutrophils and the structural cells of the lungs.

"We have concluded that this mechanism is important for understanding antibacterial defence in the lungs of healthy individuals and how the immune defence system is activated when common respiratory infections or pneumonia occur. In the long run we hope that this knowledge will play an important role in helping us to understand how groups of patients with chronic lung diseases develop an increased sensitivity to bacterial infections, which could lead to the development of a new treatment for infections," says Anders Lindén, Professor at the Institute of Environmental Medicine, who led the research project.

**More information:** "Interleukin-26 in Antibacterial Host Defense of Human Lungs: Effects on Neutrophil Mobilization." Che K, Tengvall S, Levänen B, Silverpil E, Smith M, Awad M, et al. Am. J. Respir. Crit. Care Med. 2014 Oct;(): [www.ncbi.nlm.nih.gov/pubmed/25 ...olib&tool=karolinska](http://www.ncbi.nlm.nih.gov/pubmed/25...olib&tool=karolinska)

Provided by Karolinska Institutet

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