

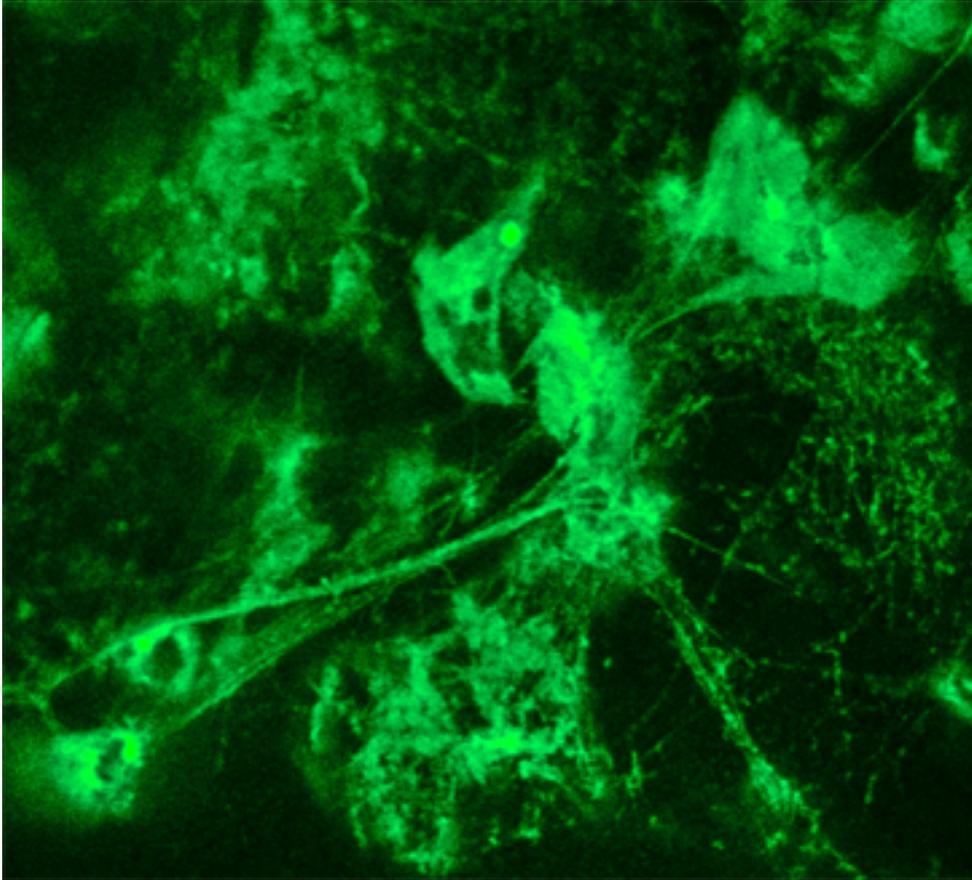
Cold exacerbates immune response of asthmatic patients

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Cold episodes, caused by rhinoviruses, can have serious consequences in asthmatic patients by inducing an exacerbation of asthma-related symptoms. However, the link between the common cold and the exacerbation of asthma remains poorly understood. Researchers at the GIGA of the University of Liège, in collaboration with the Imperial College London, discover that rhinovirus infection exacerbates the asthmatic reaction by inducing the release of host DNA into the airways. This DNA, once outside the cells, strongly amplifies the deleterious immune reaction at the origin of allergic asthma. By neutralizing the process leading to the release of this DNA, it is therefore potentially possible to prevent such severe asthma exacerbations that occurs after a simple cold. This discovery is published in ***Nature Medicine***.

A collaborative study led in the laboratories of Prof. Sebastian Johnston (Professor at Imperial College London and Director of the MRC & Asthma UK in Allergic Mechanisms of Asthma) and of Dr. **Thomas Marichal** (FRS-FNRS Research Associate, **GIGA**-ULiège) and Prof. **Fabrice Bureau** (ULiège Professor and **Welbio**-Walloon Excellence in Life Sciences and Biotechnology, GIGA-ULg) helps to elucidate how the **virus** responsible for the seasonal cold shapes our immune system to promote severe exacerbations of **asthma** in individuals suffering from their disease.

The first author of the study, Dr. Marie Toussaint (a Belgian postdoctoral researcher in Professor Johnston's laboratory), first discovered that during a rhinovirus infection in asthmatic individuals, self DNA was rapidly released and detected in the airways of these patients, in a place where it is not found in normal conditions. In addition, the larger the amounts of DNA detected, the more individuals developed severe respiratory symptoms of asthma exacerbation. These human data therefore suggested that self DNA could be responsible for these exacerbations.



In order to study in details the role played by self DNA, Dr. Toussaint developed an experimental model of asthma exacerbation induced by rhinovirus in mice. As observed in humans, rhinovirus induced an exaggeration of the asthmatic response in mice, but also the release of DNA in the airways. Surprisingly, the treatment of these rhinovirus-infected mice with a DNA-degrading compound completely cured them of asthma exacerbations! Moreover, DNA injection alone recapitulated many of the asthmatic symptoms induced by rhinovirus, which clearly demonstrates the involvement of self DNA in exacerbations.

In conclusion, this international study identifies an entirely new and important role for host DNA in asthma exacerbations induced by the cold virus. It suggests that controlling the release of DNA into the respiratory tract or accelerating its elimination represent potential therapeutic options for the treatment of viral-induced asthma exacerbations.

Read also : [Progress towards new treatments for asthma](#)

(1) Marie Toussaint, David J Jackson, Dawid Swieboda, Anabel Guedán, Theodora-Dorita Tsourouktsoglou, Yee Man Ching, Coraline Radermecker, Heidi Makrinioti, Julia Aniscenko, Michael R Edwards, Roberto Solari, Frédéric Farnir, Venizelos Papayannopoulos, Fabrice Bureau, Thomas Marichal & Sebastian

L Johnston, *Host DNA released by NETosis promotes rhinovirus-induced type-2 allergic asthma exacerbation*, *Nature Medicine*, (2017); doi: 10.1038/nm.4332