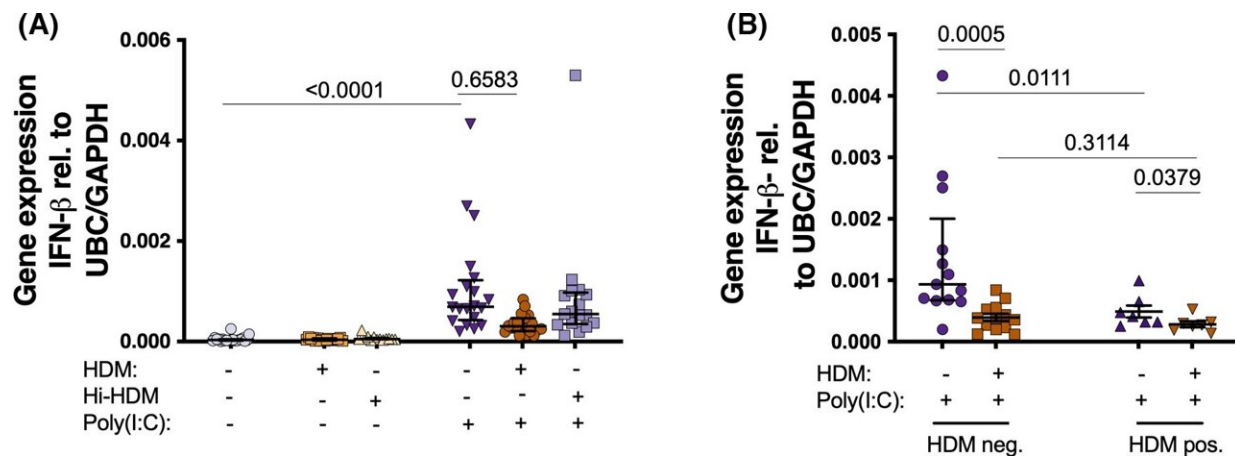


# New research on dust mites and respiratory infections

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Bronchial epithelial cells from patients with asthma were exposed to HDM or heat inactivated (hi)-HDM (20 $\mu$ g/ml) for 24 h, then stimulated with the viral mimic Poly(I:C) (A). Cells were then divided into HDM negative (HDM-; n = 2–13) and HDM positive (HDM+; n = 6–7) (B). Gene expression of IFN- $\beta$  24 h (A-B) after Poly(I:C). Samples were analyzed by the  $\Delta$ Ct method and normalized to UBC/GAPDH expression. Data are presented as median (interquartile range). Credit: *Allergy* (2022). DOI: 10.1111/all.15243

When asthmatics' respiratory tracts are exposed to dust mites, their immune response becomes less effective, which can lead to a weaker immune system. People who suffer from asthma associated with infection may therefore be more susceptible to secondary viral or bacterial infections. According to the researchers, the results suggest that

asthmatics should avoid house dust mites and that patients who are also allergic to the mites should consider undergoing so-called hyposensitization. The study was recently published in *Allergy*.

In an earlier study, Professor Lena Uller and her research team have shown that house dust mites, when compared to other common allergens, give rise to a more powerful inflammatory response in the epithelium cells in the lungs of asthmatics. These epithelium cells are a barrier intended to protect the lungs from harmful microbes and particles that we breathe in.

Clinical data has shown that asthma patients with allergies are more frequently prescribed antibiotics, compared to non-allergic asthmatics, according to Samuel Cerps, first author of the study, which was part of the doctoral thesis he submitted in late May.

"This suggests that [allergy](#) is a risk factor in bacterial infections and that got us interested in studying how exposure to [house dust mites](#) affects the immune system of asthmatics," says Cerps.

Using bronchial brushing, the researchers collected and cultivated epithelial cells from asthmatics including those with and without a dust mite allergy. The cells were then exposed to dust mites for 24 hours before being exposed to a virus. Through this method, the researchers were able to investigate how a viral infection affects the immune system in terms of both viral and bacterial infections.

"The results showed that an allergy to dust mites was in itself a factor that diminished asthmatics' protection against viruses, i.e. the [epithelial cells](#) were less effective in producing antiviral interferons. We also saw that direct exposure to dust mites, regardless of the patient's allergy status, reduced respiratory cells' production of both antiviral and antibacterial proteins when they contracted [viral infections](#)," Samuel

Cerps explains.

Lena Uller and Samuel Cerps believe that the results of the study are significant, since they increase understanding of how allergy and our immune system interact in the [respiratory tract](#).

"This demonstrates that dust mite allergy, and the mere fact that an asthmatic's respiratory tract has been exposed to dust mites, results in reduced protection from infection. As such, the study highlights the importance of mite-free environments," Lena Uller explains. "The results of the study suggest that asthmatics ought to avoid dust mites and that patients who are also allergic to dust mites might benefit from undergoing so-called hyposensitization—immunotherapy—against dust mites, in order to increase their tolerance of this allergen. Treatment could lead to fewer infections and a better quality of life as a result."

In a clinical collaboration, the researchers are now investigating to what extent hyposensitization of asthmatics towards [dust mites](#) could lead to improvements in the asthmatic's pulmonary defenses against bacteria and viruses.

"An understanding of which dust mite components inhibit the body's defenses against viruses and bacteria could lead to new medicines that block precisely those components. It is important to connect this aim to attempts to reduce the [antibiotic resistance](#) that exists in society," concludes Lena Uller.

**More information:** Samuel Cerps et al, House dust mite sensitization and exposure affects bronchial epithelial anti-microbial response to viral stimuli in patients with asthma, *Allergy* (2022). [DOI: 10.1111/all.15243](https://doi.org/10.1111/all.15243)

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