

Growing up on a farm provides protection against asthma and allergies

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Credit: Bobby Mikul/public domain

Researchers at VIB (Flanders Institute for Biotechnology, Belgium) and Ghent University have successfully established a causal relationship between exposure to so-called farm dust and protection against asthma

and allergies. This breakthrough discovery is a major step forward towards the development of an asthma vaccine. The results of the research were published in the leading journal *Science*.

It is commonly known that drinking raw cow's milk can provide protection against allergies. A 14-member research team, led by professors Bart Lambrecht and Hamida Hammad (both associated with VIB and Ghent University) has now established a solid scientific basis for this claim.

Promising tests on mice

Many years ago, it was found that children growing up on farms are far better protected against asthma and allergies. However, until recently, scientists were unable to pinpoint why this is the case.

Prof. Bart Lambrecht (VIB/Ghent University/Ghent University Hospital): "At this point, we have revealed an actual link between farm dust and protection against asthma and allergies. We did this by exposing mice to farm dust extract from Germany and Switzerland. These tests revealed that the mice were fully protected against house dust mite allergy, the most common cause for allergies in humans."

Significant role of protein A20

In addition to the [causal relationship](#), the scientists discovered the mechanism behind this: farm dust makes the [mucous membrane](#) inside the respiratory tracts react less severely to allergens such as house dust mite.

Prof. Hamida Hammad (VIB/Ghent University): "This effect is created by the A20 protein, which the body produces upon contact with farm

dust. When we inactivate the A20 protein in the mucous membrane of the lungs, farm dust is no longer able to reduce an allergic or asthmatic reaction."

Tests in patients

These findings were then tested in patients. The results showed that people suffering from allergies and asthma have a deficiency in the protective protein A20. It explains why they react to allergens so severely.

Prof. Bart Lambrecht (VIB/Ghent University/Ghent University Hospital): "We also assessed a test group of 2,000 children growing up on farms, and found that most of them are protected. Those who are not protected and still develop allergies have a genetic variant of the A20 gene which causes the A20 protein to malfunction."

Clear prospects for the future

The team's conclusions have opened up several possibilities for future research. At the moment, they are trying to identify the active substance in farm dust that is responsible for providing protection. Once this has been identified, the development of a preventive medicine against asthma may be the next step.

Prof. Hamida Hammad (VIB/Ghent University): "We already suspect that to some extent, the answer lies in the endotoxines, which form part of the cell wall of specific bacteria. There are very likely other contributing substances as well. Discovering how farm dust provides this type of protection has certainly put us on the right track towards developing an [asthma](#) vaccine and new [allergy](#) therapies. However, several years of research are required still before they will be available to

patients."

More information: Farm dust and endotoxin protect against allergy through A20 induction in lung epithelial cells,
[www.sciencemag.org/lookup/doi/ ... 1126/science.aac6623](http://www.sciencemag.org/lookup/doi/10.1126/science.aac6623)

Provided by VIB (the Flanders Institute for Biotechnology)

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