

# How manure protects against allergies

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Researchers funded by the Swiss National Science Foundation (SNSF) studied laboratory mice growing up in a cowshed. This enabled them to investigate how the farm environment modifies the immune system and provides protection against allergies.

Improved hygiene has largely eliminated infectious diseases from everyday life. There is, however, a downside to this progress: the number of allergies is growing steadily. If the immune system is not kept busy by bacteria, viruses and worms, it sometimes overreacts to harmless things like pollen.

Researchers funded by the SNSF have now investigated the mechanism underlying the "farmhouse effect", which indicates that children who grow up on a farm are less likely to suffer from allergies. "We can only use superficial parameters to study children's immune systems," says lead investigator Philippe Eigenmann from Geneva University Hospitals. "This is why we wanted to study the allergic reaction of mice in detail."

## Laboratory mice in the cowshed

For the experiment, the research group working with Eigenmann transferred mice directly to a cowshed in Vollèges near Martigny (Valais), the first time this had been done for an allergy study. Mice born on the farm reacted less intensely to an artificial allergen than those born in the laboratory. This was determined by measuring the extent of ear swelling. Mice that were not transferred to the cowshed until four weeks after birth were slightly less well protected. This finding is consistent

with data from earlier studies in humans. Eigenmann adds: "Children of farmers' wives who worked in animal sheds while they were pregnant accordingly have even fewer problems with allergies."

## Why probiotic foods don't really work

A comparison of cells and signalling substances in the immune system also shows that the reactions differ considerably. The [immune defence](#) of the farm-born mice was constantly activated but at the same time powerfully regulated by germs from the cowshed. "The immune system evidently learns to moderate its response," Eigenmann explains.

The animals' [gut flora](#) also differed depending on their living conditions. The diversity of bacteria was greater in the intestinal tract of farm [mice](#), and a certain type of virus was present in larger quantities. These mastadenoviruses could be the factor that is moderating [immune response](#).

The changes in gut flora and the [immune system](#) were many and varied, which explains why certain preventive measures based on administration of individual germs have little effect. The bacterial strains in probiotic foods such as yogurts are one example. Another is the administration of deactivated thread worm eggs. "We need to take as global an approach as possible to the factors and rethink our concept of cleanliness," Eigenmann explains.

**More information:** Christophe P. Frossard et al. The farming environment protects mice from allergen-induced skin contact hypersensitivity, *Clinical & Experimental Allergy* (2017). [DOI: 10.1111/cea.12905](#)

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