

Exposure to Environmental Microorganisms and Childhood Asthma

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FROM ABSTRACT:

Children who grow up in environments that afford them a wide range of microbial exposures, such as traditional farms, are protected from childhood asthma and atopy. In previous studies, markers of microbial exposure have been inversely related to these conditions.

Results

In both studies, children who lived on farms had lower prevalences of asthma and atopy and were exposed to a greater variety of environmental microorganisms than the children in the reference group.

Increased microbial exposure was inversely related to the risk of asthma: Reduced by 38% in one study and 14% in the other study, for an average reduction by 24%.

Conclusions

Children living on farms were exposed to a wider range of microbes than were children in the reference group, and this exposure explains a substantial fraction of the inverse relation between asthma and growing up on a farm.

KEY POINTS FROM THIS STUDY:

- 1) This study looked at two groups of children whose exposure to microorganisms was evaluated differently. Each group involved children who grew up on rural farms and a group of controls who were not farm raised children. Combined, the study group consisted of 16,511 children between ages 6-13 years.
- 2) One study analyzed children's mattress dust collected with a vacuum cleaner. One study analyzed children's room dust collected with electrostatic dust collectors.
- 3) After collection, the dust was incubated for 7 days. The colonies were microscopically counted and identified and treated with Gram's stain.
- 4) "Environmental exposure to microorganisms has repeatedly been found to be inversely related to the manifestation of atopic diseases such as asthma and hay fever."

- 5) "In the population with higher bacterial exposures, the prevalence of asthma and atopy was substantially lower."
- 6) Children living on farms had a lower prevalence of asthma than children in the reference groups in both studies by a combined 25%.
- 7) "Indoor microbial exposure is much more common and diverse in the farming environment than in the nonfarming environment."
- 8) The risk of asthma decreased significantly with the increase in the number of detectable bacteria and fungi.
- 9) "Children growing up on farms were protected from asthma and atopy. These children were exposed to a greater variety of environmental fungi and bacteria as compared with children in the reference group who lived in the same regions."
- 10) "These data support the idea that the greater diversity of microbial exposure among children who live on farms is associated with protection from the development of asthma."
- 11) The transport of environmental microorganisms from animal sheds and barns to the indoor environment has been documented. "Even when indoors, children living on farms were exposed to a greater variety of microbes than children who did not live on farms."
- 12) Microorganisms may be protective against asthma by triggering the innate immune system for a prominent Type 1 helper T cell response; predominance of type 2 helper T cells is characteristic of asthma. **["Innate Immune Response"]**
- 13) The results of both studied groups "showed that children living on farms had a wider range of microbial exposures than children in the reference groups, which largely explained the protective effect of the farming environment on the development of asthma in children."

A COMMENT FROM DAN MURPHY

Recall Article Review 9-12 indicated that early life exposure to antibiotics (which kill these microbes) was associated with a 52% increase in asthma.

The book by immunologist Mary Ruebush, PhD, Why Dirt Is Good further details why innately children are meant to come into contact with microbes; when they don't or when the microbes are killed with antibiotics, the immune system does not develop properly, there is a switch to a predominant Th2 response, and atopic disorders (asthma, hay fever, eczema, etc.) develop.