

# Low diversity of bacteria may increase the risk for asthma

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Low gut microbial diversity in the intestines of infants can increase the risk for asthma development. These are the findings of the age 7 follow-up in a multi-year study led by researchers at Linköping University in Sweden.

In 2011 the results of a comprehensive survey of the intestinal microbiota of allergic and healthy children were published. In the samples from the infancy period, the degree of variation and diversity of the bacteria strains was significantly lower among those who had developed allergic eczema when they were two years old.

A follow-up study was conducted when the 47 participating [infants](#) reached their seventh birthday. By then eight of them – 17% – were suffering from [chronic asthma](#). 28% had hay fever, 26% still had eczema, and 34% reacted to the allergens in a skin prick test. But it was only the asthma cases that could be connected to low intestinal microbial diversity at the age of one week and one month, according to the results now being published in the scientific journal *Clinical & Experimental Allergy*.

It might seem a bit of a stretch to think the contents of the [intestines](#) could influence what happens in the airways. The results of this study, however, give further credence to this connection, which has previously been demonstrated in animal studies.

"A high diversity of [gut microbiota](#) during the first months of life seems

to be important for the maturation of the immune system," says Thomas Abrahamsson, paediatrician and researcher at Linköping University, and principal author of the article.

The hypothesis is that in order to function effectively, the immune system needs to be "trained" by large numbers of different microorganisms. In the absence of sufficient stimulation from large numbers of different bacteria, the system may overreact to innocuous antigens it encounters.

A high gut [microbial diversity](#) has also been shown to strengthen the barrier function of the mucous membrane.

"We are speculating that a deficient maturity of the [immune system](#) at an earlier age and a less efficient mucosa barrier function can open the way to certain types of viral infection that can be linked to the development of asthma," says senior author Maria Jenmalm, professor of experimental allergology.

The analysis of the [bacteria](#) flora in the children's stools was carried out using a method known as 454 pyro sequencing at the Science for Life Laboratory, in conjunction with researchers Anders Andersson and Lars Engstrand. This is a powerful genetic method that identifies DNA sequences typical of different bacterial species, including those that cannot be cultivated in the traditional way.

**More information:** "Low gut microbiota diversity in early infancy precedes asthma at school age." T Abrahamsson, H Jakobsson, A F Andersson, B Björkstén, L Engstrand and M C Jenmalm. *Clinical & Experimental Allergy*, in print 2014. [onlinelibrary.wiley.com/doi/10.1111/cea.12253/abstract](http://onlinelibrary.wiley.com/doi/10.1111/cea.12253/abstract)

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