

Getting the dirt on immunity: Study shows early exposure to germs is a good thing

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(Medical Xpress) -- Previous human studies have suggested that early life exposure to microbes (i.e., germs) is an important determinant of adulthood sensitivity to allergic and autoimmune diseases such as hay fever, asthma and inflammatory bowel disease.

This concept of exposing people to germs at an early age (i.e., childhood) to build immunity is known as the hygiene hypothesis.

Medical professionals have suggested that the hygiene hypothesis explains the global increase of allergic and [autoimmune diseases](#) in urban settings. It has also been suggested that the hypothesis explains the changes that have occurred in society and [environmental exposures](#), such as giving antibiotics early in life.

However, neither biologic support nor a mechanistic basis for the hypothesis has been directly demonstrated. Until now.

Researchers at Brigham and Women's Hospital (BWH) have conducted a study that provides evidence supporting the hygiene hypothesis, as well as a potential mechanism by which it might occur.

The study will be published online in the journal *Science* on the [Science Express](#) website on March 22, 2012.

The researchers studied the immune system of mice lacking bacteria or any other microbes ("germ-free mice") and compared them to mice

living in a normal environment with microbes.

They found that germ-free mice had exaggerated inflammation of the lungs and colon resembling asthma and colitis, respectively. This was caused by the hyperactivity of a unique class of T cells ([immune cells](#)) that had been previously linked to these disorders in both mice and humans.

Most importantly, the researchers discovered that exposing the germ-free mice to microbes during their first weeks of life, but not when exposed later in adult life, led to a normalized immune system and prevention of diseases.

Moreover, the protection provided by early-life exposure to microbes was long-lasting, as predicted by the [hygiene hypothesis](#).

"These studies show the critical importance of proper immune conditioning by microbes during the earliest periods of life," said Richard Blumberg, MD, chief for the BWH Division of Gastroenterology, Hepatology and Endoscopy, and co-senior study author, in collaboration with Dennis Kasper, MD, director of BWH's Channing Laboratory and co-senior study author. "Also now knowing a potential mechanism will allow scientists to potentially identify the microbial factors important in determining protection from allergic and autoimmune diseases later in life."

In light of the findings, the researchers caution that further research is still needed in humans.

More information: www.sciencemag.org/content/ear.../3/21/science.1219328

Provided by Brigham and Women's Hospital

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