

'Friendly' bacteria protect against type 1 diabetes

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In a dramatic illustration of the potential for microbes to prevent disease, researchers at Yale University and the University of Chicago showed that mice exposed to common stomach bacteria were protected against the development of Type I diabetes.

The findings, reported in the journal *Nature*, support the so-called "hygiene hypothesis" – the theory that a lack of exposure to parasites, bacteria and viruses in the developed world may lead to increased risk of diseases like allergies, asthma, and other disorders of the immune system.

The results also suggest that exposure to some forms of bacteria might actually help prevent onset of Type I diabetes, an autoimmune disease in which the patient's immune system launches an attack on cells in the pancreas that produce insulin.

The root causes of autoimmune disease have been the subject of intensive investigation by scientists around the world.

In the past decade, it has become evident that the environment plays a role in the development of some overly robust immune system responses. For instance, people in less-developed parts of the world have a low rate of allergy, but when they move to developed countries the rate increases dramatically. Scientists have also noted the same phenomenon in their labs. Non-obese diabetic (NOD) mice develop the disease at different rates after natural breeding, depending upon the environment

where they are kept. Previous research has shown that NOD mice exposed to killed (i.e., non-active) strains of tuberculosis or other disease-causing bacteria are protected against the development of Type I diabetes. This suggests that the rapid "innate" immune response that normally protects us from infections can influence the onset of Type 1 diabetes.

In the *Nature* paper, teams led by Li Wen at Yale and Alexander V. Chervonsky at the University of Chicago showed that NOD mice deficient in innate immunity were protected from diabetes in normal conditions. However, if they were raised in a germ-free environment, lacking "friendly" gut bacteria, the mice developed severe diabetes. NOD mice exposed to harmless bacteria normally found in the human intestine were significantly less likely to develop diabetes, they reported.

"Understanding how gut bacteria work on the immune system to influence whether diabetes and other autoimmune diseases occurs is very important," Li said. "This understanding may allow us to design ways to target the immune system through altering the balance of friendly gut bacteria and protect against diabetes."

Source: Yale University

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