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Immune system quirk could lead to effective tularemia vaccine

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Immunologists at the University of Pittsburgh School of Medicine and Children's Hospital of Pittsburgh of UPMC and the have found a unique quirk in the way the immune system fends off bacteria called Francisella tularensis, which could lead to vaccines that are better able to prevent tularemia infection of the lungs. Their findings were published today in the early, online version of *Immunity*.

F. tularensis is an intracellular pathogen that infects cells in the lungs called macrophages, explained senior author Shabaana A. Khader, Ph.D., assistant professor of pediatrics and immunology at the School of Medicine and an immunologist at Children's Hospital. Until now, scientists thought that eliciting a strong immune response to clear the infection would only require activation of a cytokine protein called interferon gamma (IFN-gamma). But that's not true for F. tularensis as it is for other intracellular bacteria, such as the TB-causing Mycobacterium tuberculosis.

"Our lab experiments show that in order to activate IFN-gamma in pulmonary tularemia, it is necessary to first induce production of another cytokine called interleukin-17," Dr. Khader explained. "So if we want to make an effective vaccine against tularemia, we must target ways to boost IL-17."

According to the U.S. Centers for Disease Control and Prevention (CDC), the virulent strain of tularemia commonly causes infection in wild animals, and about 200 human cases are reported annually in the

United States. It can be spread through the bites of infected insects, the handling of sick or dead animals, eating or drinking bacteria-contaminated food or water, or by inhalation of airborne bacteria. Antibiotic treatment is effective.

Although not transmissible from person to person, it is highly infectious. Because only a small amount of the virulent bacteria can cause disease and spread through the air to cause severe respiratory illness, it could be a candidate for a bioweapon, the CDC has noted. A safe, lab-adapted live vaccine strain was used in Dr. Khader's study.

Dr. Khader's team will continue its work by studying how to target lung IL-17 responses to develop vaccine strategies for pulmonary tularemia.

Source: University of Pittsburgh Schools of the Health Sciences (news : web)