

Researchers identify changes in lung cells following infections

May 17 2017

When people develop a respiratory infection, recovery from their illness leaves behind an immunological memory that influences how they will respond to later infections.

In a new study, researchers demonstrate for the first time that recovery from bacterial pneumonia changes the tissue that was infected, seeding the lungs with immune cells called resident memory T (TRM) cells.

Differences in the numbers and activities of these lung TRM cells may be responsible for the increased susceptibility of young [children](#) and [older adults](#) to pneumonia and manipulating these cells may provide novel treatment options for curing pneumonia. The study appears in the journal *Mucosal Immunology*.

Worldwide, pneumonia remains a serious public health burden. Each year more than one million children under the age of five die from pneumonia and associated complications. In the U.S., pneumonia is the most common reason for the hospitalization of children and accounts for nearly half of the infectious disease-related hospitalizations and deaths of older [adults](#).

To model the typical experience of most children, an experimental model received a series of mild and non-life threatening respiratory infections. A control model received sterile saline instead of infections. When compared to the control model, those with prior respiratory infections were profoundly resistant to severe (life-threatening)

pneumonia.

"Our study suggests that respiratory bacterial infections during childhood establish a novel type of antibacterial immunity," explained corresponding author Joseph Mizgerd, ScD, professor of medicine, microbiology and biochemistry at Boston University School of Medicine. "The TRM cells left behind after prior infections are more broadly effective than vaccine-generated immunity, providing protection against a wider spectrum of microbes that can infect the lungs."

Young children and older adults are highly susceptible to pneumonia, but the factors that are responsible for preventing pneumonia in young healthy adults are still not understood. "We have only modest abilities to prevent or cure many of the infections that cause [pneumonia](#). Defining the protective mechanisms normally preventing [lung infections](#) in most young healthy adults will lead to tests identifying who is susceptible and new approaches for preventing and treating the infections," added Mizgerd.

More information: N MS Smith et al, Regionally compartmentalized resident memory T cells mediate naturally acquired protection against pneumococcal pneumonia, *Mucosal Immunology* (2017). [DOI: 10.1038/MI.2017.43](#)

Provided by Boston University Medical Center

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