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Researcher decodes the language of memory cells in Science article

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When an infection attacks, the body's immune system sounds the alert, kills the invading germs and remembers the pathogen to protect against contracting the same type of infection again. Exactly how immunological memory develops is a mystery just beginning to be unveiled by Emma Teixeiro, PhD, in an article published in the Jan. 23 issue of the journal *Science*.

The key finding is that a distinct program generates the memory cells that protect an individual against re-infection. This current work uncovers some of the language that is necessary to start this program, said Teixeiro, assistant professor of molecular microbiology, immunology and surgery at the University of Missouri School of Medicine.

Teixeiro cites vaccination as the most practical example of how to generate cells that remember infections. With a single shot, the body is infected with a small dose of a pathogen, so the next time the body is exposed, it immediately recognizes the invader and fights it off, preventing disease.

"When the human body is infected, T cells recognize the pathogen with a specific receptor and kill the infection," Teixeiro said. "But once the infection has been cleared, a small number of cells survive. These are the memory T cells."

Teixeiro's lab used a mouse model to test how communication inside a T

cell would affect a body's ability to fight infection. Two groups of mice - some with normal T cells and others with a mutation in their pathogen receptor - were infected with listeria monocytogenes, a bacterium often associated with food-borne illness in humans. Both groups of mice fought off the infection equally well, but those with the cell mutation were not able to generate memory T cells to protect against future infection due to a disruption in certain signals within the cell.

"A person with this cell mutation would not develop memory T cells. If we knew what was necessary to generate these memory cells, we would not need to worry about fighting the same infection over and over again," Teixeiro said, noting a direction for continued research. "We are currently figuring out which signals are important for memory generation and protection. This is important for improving vaccines and tumor immunotherapies."

Source: University of Missouri-Columbia