

# Study finds depletion of alveolar macrophages linked to bacterial super-infections

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A recent study published in the July issue of the *Journal of Immunology* helps explain why some humans contract bacterial super-infections like pneumonia with influenza. The research was led by Le Bonheur Pediatrician-in-Chief Jon McCullers, MD – an infectious disease specialist who is also chair of the Department of Pediatrics for the University of Tennessee Health Science Center and adjunct faculty at St. Jude Children's Research Hospital.

"It's been known that the [influenza virus](#) does something to suppress host immune function, which can facilitate development of deadly secondary bacterial pneumonias," said McCullers. "But we haven't known what that was or why it happens."

McCullers' research – conducted at his National Institutes of Health-funded laboratory at St. Jude Children's Research Hospital by UTHSC graduate student Hazem Ghoneim, a PhD candidate—used advanced techniques to differentiate types of [alveolar macrophages](#) found in the lungs and airways. Researchers found that of the three types identified, only one is truly capable of fending off [secondary bacterial infection](#). This population of macrophages, labeled the resident alveolar macrophages, is depleted during a flu infection.

"We found that influenza is specifically killing these true alveolar macrophages," said McCullers. "The window of time someone is susceptible to secondary infections corresponds with the time it takes for the other two types of alveolar macrophages to differentiate so they are then able to fight off the infection."

McCullers says his study is a step toward developing strategies for treatment.

"This discovery provides a roadmap for developing immunotherapies that can supplement the natural defenses of our body when they are at their weakest. Influenza and pneumonia are the seventh leading cause of death in the U.S., and we desperately need research such as this to improve our [armamentarium](#)," said McCullers.

#### More information:

[www.ncbi.nlm.nih.gov/pubmed/23804714?dopt=Abstract](http://www.ncbi.nlm.nih.gov/pubmed/23804714?dopt=Abstract)

Provided by Le Bonheur Children's Hospital

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