

Scientists learn why the flu may turn deadly

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As the swine flu continues its global spread, researchers from the Children's Hospital of Philadelphia, Pennsylvania, have discovered important clues about why influenza is more severe in some people than it is in others.

In their research study published online in the *Journal of Leukocyte Biology*, the scientists show that the [influenza](#) virus can actually paralyze the immune systems of otherwise healthy individuals, leading to severe secondary bacterial infections, such as pneumonia. Furthermore, this immunological paralysis can be long-lived, which is important to know when developing treatment strategies to combat the virus.

According to Kathleen Sullivan, M.D., Ph.D., the senior researcher involved in the study and Chief of the Division of Allergy and Immunology at the Children's Hospital of Philadelphia, "We have a very limited understanding of why some people who get influenza simply have a bad cold and other people become very sick and even die. The results of this study give us a much better sense of the mechanisms underlying bacterial infections arising on top of the viral infection."

Sullivan and colleagues recruited pediatric patients with severe influenza and examined the level of [cytokines](#), which serve as the first line initiators of immune response, in the blood plasma. Although they found elevated levels of cytokines, they also found a decreased response of toll-like receptors, which activate immune cell responses as a result of invading microbes. This suggests that the diminished response of these receptors may be responsible for the paralysis of the immune system,

leading to secondary bacterial infections.

The influenza patients were compared with patients with moderate influenza, respiratory syncytial virus, and a control group of healthy individuals. The immune paralysis appeared to be specifically a result of influenza infection and was not seen in patients with respiratory syncytial virus. This process might explain why one quarter of children who die from influenza, die from a [bacterial infection](#) occurring on top of the virus.

"Despite major medical advances since the devastating flu outbreak of 1918 and 1919, influenza virus infection remains a very serious threat," said John Wherry, Ph.D., Deputy Editor of the [Journal of Leukocyte Biology](#), "and the current [swine flu](#) outbreak is a grim reminder of this fact. The work by Dr. Sullivan and colleagues brings us a step closer to understanding exactly what goes wrong in some people who get the flu, so, ultimately, physicians can develop more effective treatment strategies."

More information: Meredith L. Heltzer, Susan E. Coffin, Kelly Maurer, Asen Bagashev, Zhe Zhang, Jordan S. Orange, and Kathleen E. Sullivan. Immune dysregulation in severe influenza. doi:10.1189/jlb.1108710. www.jleukbio.org/papbyrecent.shtml

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