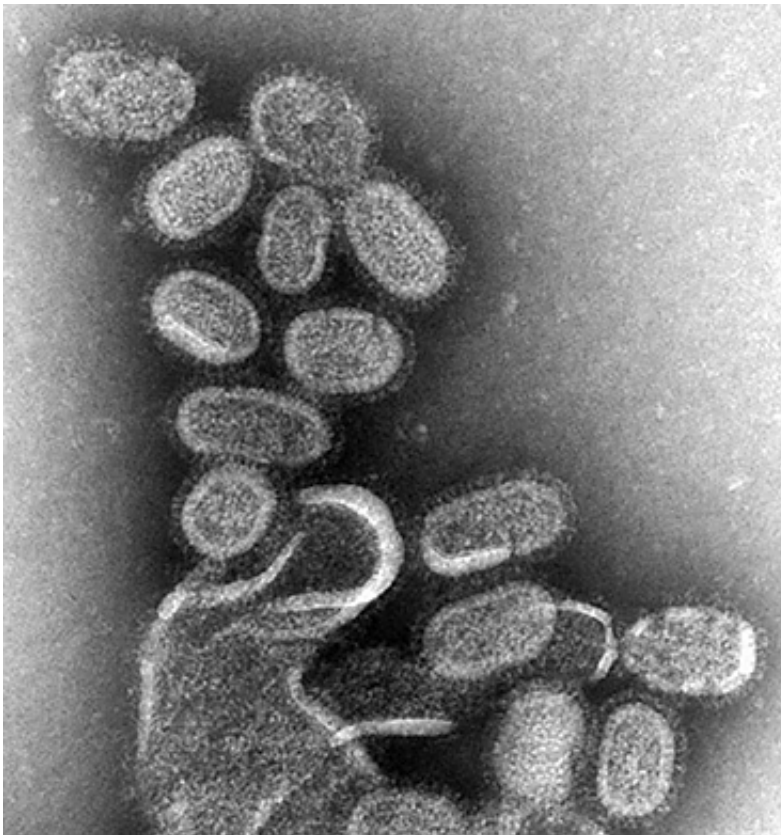


Scientists reveal details of how flu and bacteria work together to promote infection

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Electron microscopy of influenza virus. Credit: CDC

St. Jude Children's Research Hospital scientists have evidence the influenza virus functions like Velcro to help common respiratory bacteria gain a foothold in the airways. The research appears today as an advance online publication in the journal *Nature Microbiology*.

Researchers report for the first time that flu sticks to the surface of common respiratory bacteria and could significantly enhance the ability of the bacteria to adhere to cells that line the airways. Mortality was higher in mice infected with the virus-bacteria complex compared to mice infected with bacteria alone or flu and bacteria that were not incubated together prior to [infection](#).

"The bacteria seem to decorate their surface with [flu virus](#), which enhances the bacteria's ability to adhere to respiratory tissue early in the infection," said corresponding author Jason Rosch, Ph.D., an associate member of the St. Jude Department of Infectious Diseases. "This appears to be another way bacteria and virus work synergistically early in the infection to promote disease.

"The results offer insight for designing more effective vaccines."

Mutually beneficial interactions among different viruses and bacteria in the intestines and airways have previously been reported.

Bacterial pneumonia is one of the most common and lethal flu complications. Flu and pneumonia remain a leading cause of death in the U.S. While there are known [risk factors](#) for flu complications, this research suggests the interaction among the respiratory pathogens has been underappreciated.

The research involved different influenza A viruses and various strains of Gram-negative and Gram-positive bacteria. Bacterial adherence increased when the viruses and bacteria were first incubated together for 30 minutes.

"Both the bacteria and virus likely benefit from the interaction, possibly by hitching a ride when infected individuals cough or sneeze and transmission occurs," Rosch said. Bacteria and [virus](#) use different

receptors to adhere to the respiratory system, so working together might be an advantage.

While the bacteria in this study are commonly found in the nose, they can spread to infect the lungs, where they cause pneumonia; or the middle ear where they cause ear infections. The researchers said the [direct interaction](#) between flu and [bacteria](#) might promote viral spread.

More information: Hannah M. Rowe et al. Direct interactions with influenza promote bacterial adherence during respiratory infections, *Nature Microbiology* (2019). [DOI: 10.1038/s41564-019-0447-0](https://doi.org/10.1038/s41564-019-0447-0)

Provided by St. Jude Children's Research Hospital

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