Want to block flu transmission? Targeting nasal bacteria may help

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Stacey Schultz-Cherry, Ph.D., and Jason Rosch, Ph.D., both of st. Jude Infectious Diseases, led the respiratory bacteria research and are corresponding authors. Credit: St. Jude Children's Research Hospital

Antibiotics won't help you recover from the flu, but an antibiotic ointment helped St. Jude Children's Research Hospital scientists identify

a possible strategy for slowing influenza infections. The work appeared in the journal *mSystems*.

Researchers showed that direct interaction between Streptococcus pneumoniae (pneumococcus) bacteria and influenza A promoted airborne transmission of the virus in ferrets. The scientists reported that influenza A survived longer in the environment and remained infectious when bound to the bacteria. An antibiotic ointment applied to the nasal passages of flu-infected ferrets selectively reduced levels of S. pneumoniae and other common nasal bacterium in the ferrets and blocked airborne transmission of flu to uninfected animals. Flu transmission was restored when pneumococcus was reintroduced into the ferrets' noses.

"While antibiotics have no effect on the flu virus or flu symptoms, this study suggests that targeting common respiratory bacteria, possibly with vaccines, may offer a novel way to slow flu infections," said Jason Rosch, Ph.D., of the St. Jude Department of Infectious Diseases. He and Stacey Schultz-Cherry, Ph.D., of Infectious Diseases, led the research and are corresponding authors.

Flu and bacteria have a history

Flu infections, particularly when complicated by secondary bacterial infections, are a leading cause of illness and death worldwide. "Until recently the role of direct interaction between the virus and bacteria in infectious disease biology and disease transmission has been underappreciated," Schultz-Cherry said.

S. pneumoniae is the most common cause of sepsis, pneumonia, meningitis and middle ear infections in young children. Previous St. Jude studies showed that binding influenza A enhanced the spread of the bacteria in mice.

Studies of flu transmission in households have suggested that the respiratory microbiome of flu patients may influence viral spread. "Data in this study suggest that modulating the makeup of the respiratory microbiome, possibly through vaccination, may profoundly affect flu transmission," Schultz-Cherry said. Rosch and his colleagues have already developed an experimental vaccine to block pneumococcal transmission.

Further research is needed to determine if the findings extend to other viral-bacterial interactions, including the virus that causes COVID-19.

More information: Hannah M. Rowe et al. Respiratory Bacteria Stabilize and Promote Airborne Transmission of Influenza A Virus, *mSystems* (2020). DOI: 10.1128/mSystems.00762-20

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