

# Newly identified antibodies may improve pneumonia vaccine design

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Researchers at Albert Einstein College of Medicine of Yeshiva University have discovered how a novel type of antibody works against pneumococcal bacteria. The findings, which could improve vaccines against pneumonia, appear in the September/October issue of *mBio*, the online journal of the American Society for Microbiology.

Until recently, scientists thought that [antibodies](#) work against [pneumococcal bacteria](#) by killing them with the help of [immune cells](#). However, several years ago, Einstein researchers discovered antibodies that were very effective against experimental pneumococcal disease in mice even though they were not able to induce bacterial killing by immune cells. In the current study, the researchers examined how these antibodies interact with pneumococcal bacteria and found that they cause the bacteria to clump together, enhancing a phenomenon called quorum sensing.

"Quorum sensing is a way that bacteria communicate with one another," explained senior author Liise-anne Pirofski, M.D., professor of ([www.einstein.yu.edu/medicine/medicine.aspx](http://www.einstein.yu.edu/medicine/medicine.aspx)) medicine and of microbiology & immunology, chief of infectious diseases at Einstein and Montefiore Medical Center, the University Hospital for Einstein, and the Selma and Dr. Jacques Mitrani Professor in Biomedical Research at Einstein. "Here, the ability of antibodies to enhance quorum sensing causes the bacteria to express genes that could kill some of their siblings, something called fratricide, and weaken the defense mechanisms that enable bacteria to survive and grow in a hostile environment."

The National Foundation for Infectious Diseases estimates that 175,000 people are hospitalized with pneumococcal pneumonia in the United States each year. In addition, pneumococcal bacteria cause 34,500 bloodstream infections and 2,200 cases of meningitis annually.

There are two pneumococcal vaccines: one for adults and one for infants and children. The pediatric pneumococcal conjugate [vaccine](#) has dramatically reduced the incidence of [pneumococcal disease](#) in children and adults by protecting vaccinated children and by reducing person-to-person transmission of the bacterium, (a phenomenon known as herd protection). However, the vaccine doesn't cover all strains of disease-causing pneumococcus, and the vaccine currently used for adults does not prevent [pneumonia](#). Fortifying current pneumococcal vaccines to stimulate antibodies that make pneumococcal bacteria less able to protect themselves -- or kill them directly -- could enhance their effectiveness.

**More information:** The paper is titled "Antibodies to Streptococcus pneumoniae Capsular Polysaccharide Enhance Pneumococcal Quorum Sensing."

Provided by Albert Einstein College of Medicine

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