

Scientists describe potential antibody treatment for multidrug-resistant *K. pneumoniae*

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Klebsiella bacteria. Credit: NIAID

Researchers are developing a promising alternative to antibiotic treatment for infections caused by *Klebsiella pneumoniae* bacteria resistant to carbapenem antibiotics. The approach uses antibodies to target the *K. pneumoniae* protective capsule polysaccharide, allowing immune system cells called neutrophils to attack and kill the bacteria. The early stage, *in vitro* research was conducted by scientists at NIAID's Rocky Mountain Laboratories and the New Jersey Medical School-Rutgers University.

Klebsiella bacteria cause about 10 percent of all hospital-acquired infections in the United States. A carbapenem-resistant *K. pneumoniae* strain known as multilocus sequence type 258 (ST258) is one of

the antibiotic-resistant organisms labeled an urgent threat by the Centers for Disease Control and Prevention. ST258 is particularly concerning because it is resistant to most antibiotics. It is a significant cause of mortality among people with [bloodstream infections](#).

The researchers first determined that the bacterial [capsule](#) prevents immune system neutrophils from ingesting and killing ST258. They then extracted capsule from the two most abundant capsule types of ST258 and used them to generate antibodies in rabbits. In cell culture experiments they found that one of the antibodies enhanced the ability of neutrophils to ingest and kill bacteria. These results are a "proof of concept" for a potential immunotherapy approach for treatment of multidrug-resistant *K. pneumoniae* infections, the authors write.

Next up, the researchers will test the therapeutic concept in mice. They also will compare immunization with purified capsule polysaccharide as a preventive approach (active immunization) versus using capsule-specific [antibodies](#) as a therapy (passive immunization). Ultimately, they hope either antibody treatment alone or in combination with antibiotics could greatly improve care for people with multidrug-resistant *K. pneumoniae* infections.

More information: Scott D. Kobayashi et al, Antibody-Mediated Killing of Carbapenem-Resistant ST258 *Klebsiella pneumoniae* by Human Neutrophils, *mBio* (2018). [DOI: 10.1128/mBio.00297-18](https://doi.org/10.1128/mBio.00297-18)

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