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NIH advances understanding of defenses against antibiotic-resistant klebsiella bacteria

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Klebsiella bacteria cause about 10 percent of all hospital-acquired infections in the United States. *K. pneumoniae* sequence type 258 (ST258) is one of the Carbapenem-Resistant Enterobacteriaceae organisms labeled an urgent threat by the Centers for Disease Control and Prevention. This strain of bacteria is particularly concerning because it is resistant to most antibiotics and kills nearly half of people with bloodstream infections.

National Institutes of Health (NIH) scientists and their colleagues seeking alternatives to antibiotics report that an antibody-based therapy approach may be useful against ST258 bacteria. Studies of modified human blood samples showed that a component of the innate immune system called the complement system is pivotal to killing ST258. The complement system includes nine proteins (C1-9) that help protect against bacterial infections, a process aided by antibodies.

Their study determined that killing of ST258 corresponds with a portion of the complement system known as the membrane attack complex (C5b-C9), which contacts bacterial surfaces. Blood depleted of antibodies and/or the complement system had a significantly reduced ability to kill antibiotic-resistant ST258 bacteria.

The scientists, ultimately hoping to develop new tools to treat and prevent these infections, now plan to test a modified antibody against ST258 in laboratory blood and animal infection models. They also plan to learn more about the complement system in people with *K.*

pneumoniae bloodstream infections. They note that ST258 bacteria reside harmlessly in most healthy people; infection is usually of significant concern only for those in healthcare settings suffering from co-existing conditions or diseases.

More information: Frank R. DeLeo et al, Survival of carbapenem-resistant ST258in human blood, *Antimicrobial Agents and Chemotherapy* (2017). DOI: 10.1128/AAC.02533-16

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