Scientists investigate phages that can kill the world's leading superbug, Acinetobacter baumannii

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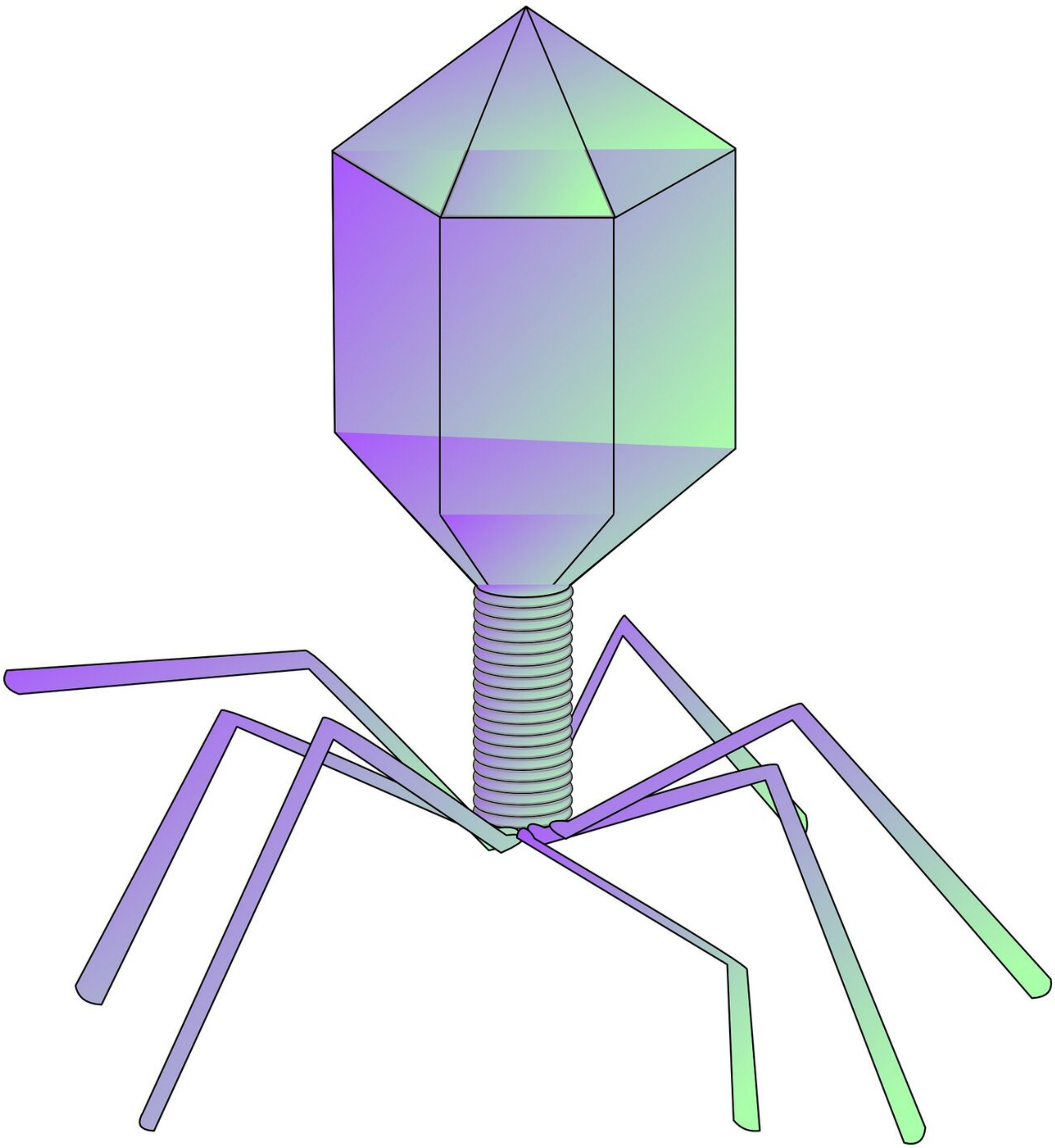

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A major risk of being hospitalised is catching a bacterial infection.

Hospitals, especially areas including intensive care units and surgical wards, are teeming with bacteria, some of which are resistant to antibiotics—they are infamously known as 'superbugs'.

Superbug infections are difficult and expensive to treat, and can often lead to dire consequences for the patient.

Now, new research published today in the prestigious journal *Nature Microbiology* has discovered how to revert antibiotic-resistance in one of the most dangerous superbugs.

The strategy involves the use of bacteriophages (also known as 'phages').

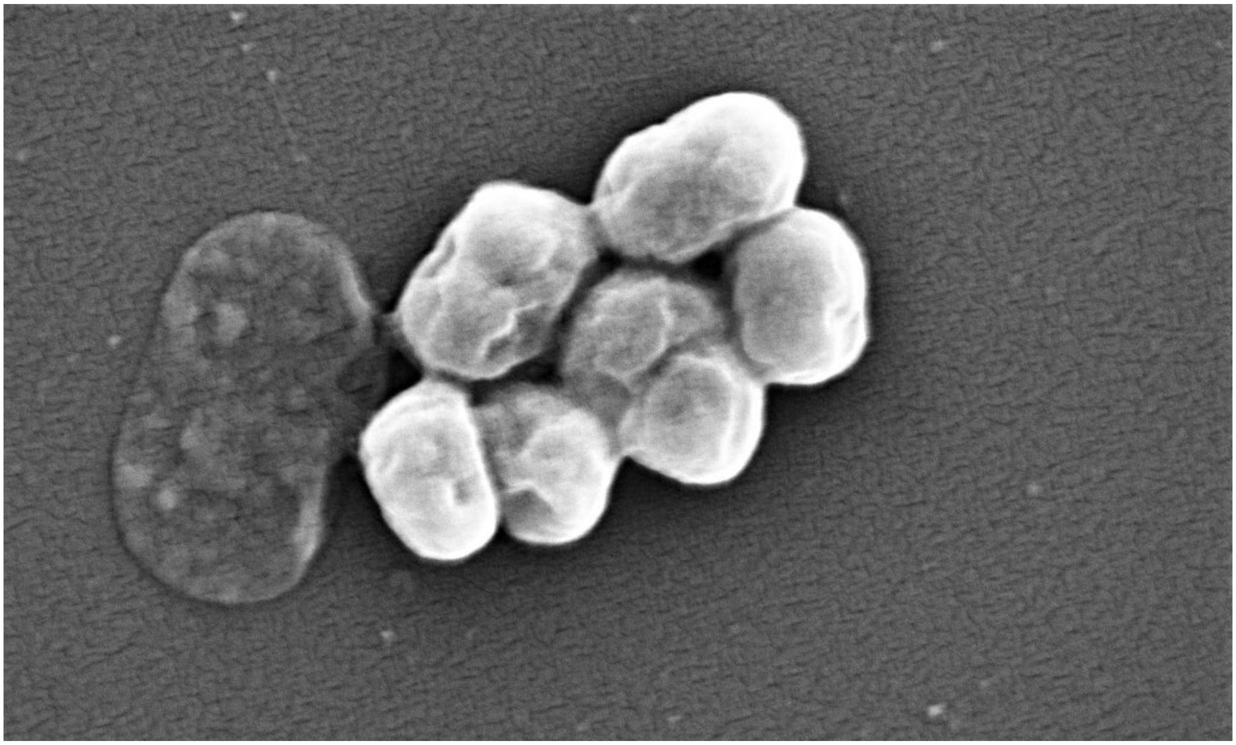
"Phages are viruses, but they cannot harm humans," said lead study author Dr. Fernando Gordillo Altamirano, from the Monash University School of Biological Sciences.

"They only kill bacteria."

The research team investigated phages that can kill the world's leading superbug, *Acinetobacter baumannii*, which is responsible for up to 20 percent of infections in intensive care units.

"We have a large panel of phages that are able to kill antibiotic-resistant *A. baumannii*," said Dr. Jeremy Barr, senior author of the study and Group Leader at the School of Biological Sciences and part of the Centre to Impact AMR.

"But this superbug is smart, and in the same way it becomes resistant to antibiotics, it also quickly becomes resistant to our phages," Dr. Barr said.



Acinetobacter baumannii. Credit: Vader1941 / Wikimedia / CC BY-SA 4.0

The study pinpoints how the superbug becomes resistant to attack from phages, and in doing so, the superbug loses its resistance to antibiotics.

"A. baumannii produces a capsule, a viscous and sticky outer layer that protects it and stops the entry of antibiotics," said Dr. Gordillo Altamirano.

"Our phages use that same capsule as their port of entry to infect the bacterial cell.

"In an effort to escape from the phages, *A. baumannii* stops producing its capsule; and that's when we can hit it with the antibiotics it used to resist."

The study showed resensitisation to at least seven different antibiotics.

"This greatly expands the resources to treat *A. baumannii* infections," Dr. Barr said.

"We're making this superbug a lot less scary."

Even though more research is needed before this therapeutic strategy can be applied in the clinic, the prospects are encouraging.

"The phages had excellent effects in experiments using mice, so we're excited to keep working on this approach," said Dr. Gordillo Altamirano.

"We're showing that phages and antibiotics can work great as a team."

More information: Fernando Gordillo Altamirano et al, Bacteriophage-resistant Acinetobacter baumannii are resensitized to antimicrobials, *Nature Microbiology* (2021). DOI: 10.1038/s41564-020-00830-7

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