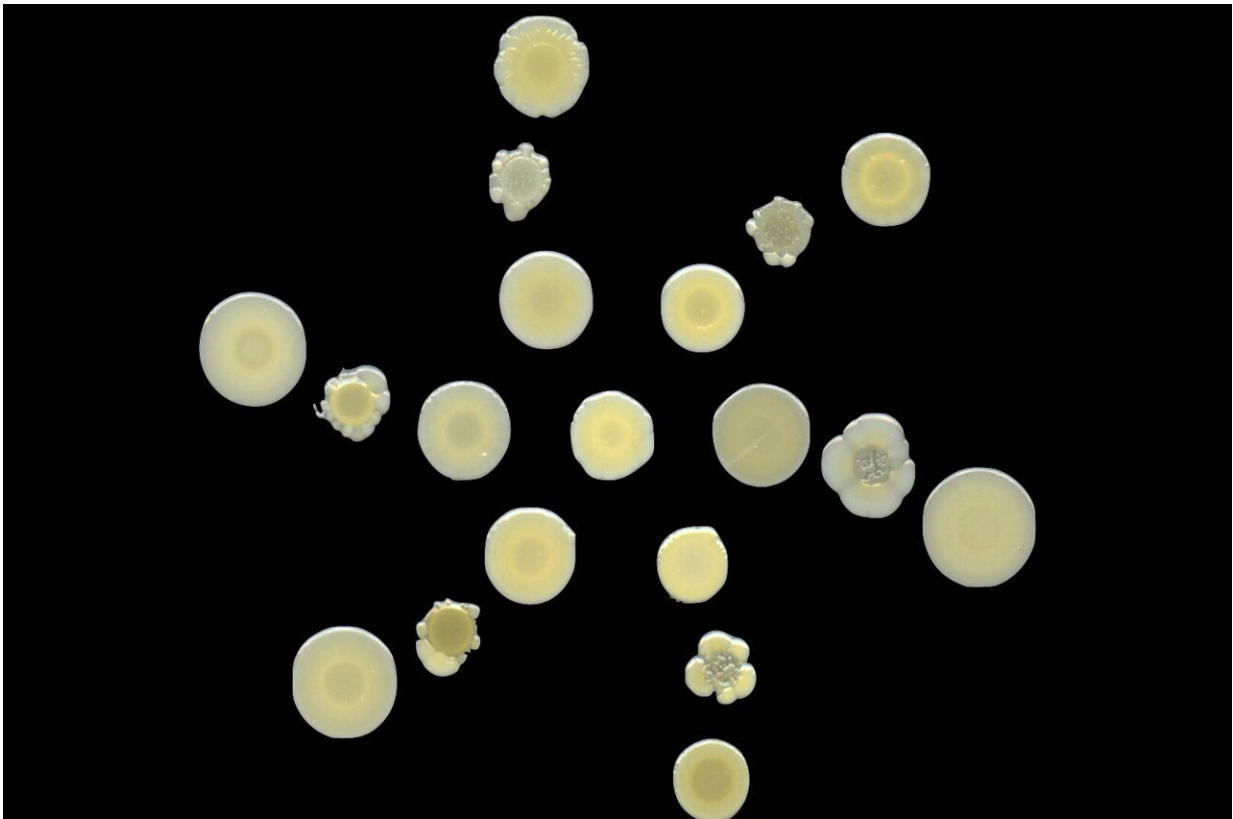


Bacteria able to overcome cost of vancomycin resistance in lab setting

August 29 2024



Vancomycin resistant *Staphylococcus aureus* (VRSA) radiating from its ancestor show the development of mutants that may someday pose a threat in the clinic.

Credit: Samuel Blechman, CC-BY 4.0,
<https://creativecommons.org/licenses/by/4.0/>)

Staphylococcus aureus has the potential to develop durable vancomycin

resistance, according to a study published August 28, 2024, in the open-access journal *PLOS Pathogens* by Samuel Blechman and Erik Wright from the University of Pittsburgh, U.S..

Despite decades of widespread treatment with the antibiotic [vancomycin](#), vancomycin resistance among the bacterium *S. aureus* is extremely uncommon—only 16 such cases have reported in the U.S. to date. Vancomycin resistance mutations enable bacteria to grow in the presence of vancomycin, but they do so at a cost.

Vancomycin-resistant *S. aureus* (VRSA) strains grow more slowly and will often lose their resistance mutations if vancomycin is not present. The reason behind vancomycin's durability and the potential for VRSA strains to further adapt have not been adequately explored.

In this study, researchers took four VRSA strains and grew them in the presence and absence of vancomycin to see how the strains would evolve. They found that strains grown in the presence of vancomycin developed additional mutations in the *ddl* gene, which has previously been associated with vancomycin dependence.

These mutations enabled VRSA strains to grow faster when vancomycin was present. Unlike the original strains, which quickly lost vancomycin resistance, the evolved strains maintained resistance through several generations, even when vancomycin was no longer present.

The study shows that durability of vancomycin susceptibility to date should not be taken for granted. The trade-off that often comes with vancomycin resistance can be overcome if the bacteria is allowed to grow in the presence of vancomycin. As [antibiotic resistance](#) continues to grow as a [public health threat](#), studies like this underscore the importance of developing [new antibiotics](#).

The authors add, "The superbug MRSA has been held off by the antibiotic vancomycin for decades. A new study shows we will not be able to count on vancomycin forever."

More information: Vancomycin-resistant *Staphylococcus aureus* (VRSA) can overcome the cost of antibiotic resistance and may threaten vancomycin's clinical durability, *PLOS Pathogens* (2024). DOI: [10.1371/journal.ppat.1012422](https://doi.org/10.1371/journal.ppat.1012422)

Provided by Public Library of Science

Citation: Bacteria able to overcome cost of vancomycin resistance in lab setting (2024, August 29) retrieved 30 August 2024 from <https://phys.org/news/2024-08-bacteria-vancomycin-resistance-lab.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.