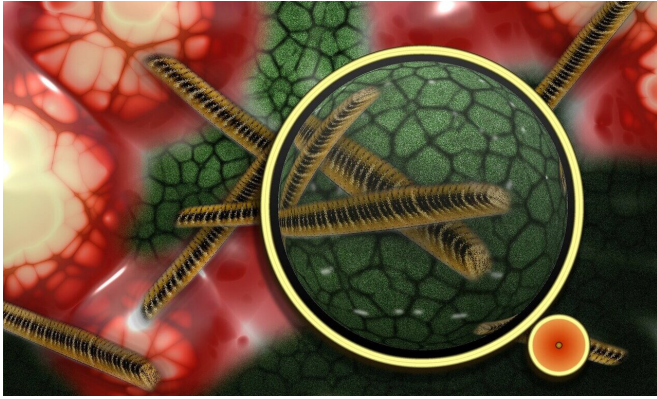


A potential new weapon in the war against superbugs

2 June 2020



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University of Melbourne researchers are finding ways to beat dangerous superbugs with 'resistance resistant' antibiotics, and it could help in our fight against coronavirus (COVID-19) complications.

As bacteria evolve, they develop strategies that undermine [antibiotics](#) and morph into 'superbugs' that can resist most available treatments and cause potentially [lethal infections](#).

The Melbourne team has shown that a newly discovered natural antibiotic, [teixobactin](#), could be effective in treating bacterial lung conditions such as tuberculosis and those commonly associated with COVID-19.

Their work could pave the way for a new generation of treatments for particularly stubborn superbugs.

Teixobactin was discovered in 2015 by a team led by Professor Kim Lewis at Northeastern University in Boston in 2015. His company is now developing it as a human therapeutic.

The new University of Melbourne research,

published in *mSystems*, is the first to explain how teixobactin works in relation to the superbug *Staphylococcus aureus* – also known as MRSA.

MRSA is among bacteria responsible for several difficult-to-treat infections in humans, particularly post-viral secondary bacterial infections such as COVID-19 chest infections and influenza.

University of Melbourne Research Fellow in anti-infectives Dr Maytham Hussein and Associate Professor Tony Velkov's team synthesized an aspect of teixobactin to produce a compound that showed excellent effectiveness against MRSA, which is resistant to the antibiotic methicillin.

Dr Hussein said that there was no way to stop bacteria like MSRA from developing resistance to antibiotics as it was part of its evolution. This made combatting it extremely challenging.

"The rise of multi [drug-resistant bacteria](#) has become inevitable," Dr Hussein said. "These bacteria cause many deadly infections, particularly in immunocompromised patients such as [diabetic patients](#) or those with cancers, or even elderly people with post-flu secondary bacterial infections."

The University of Melbourne team is the first to find that teixobactin significantly suppressed mechanisms involved in resistance to vancomycin-based antibiotics that are recommended for complicated skin infections, bloodstream infections, endocarditis, bone and joint infections, and MRSA-caused meningitis.

The development could lead to new lung [infection](#) treatments and Associate Professor Velkov said it would greatly facilitate the pre-clinical development of teixobactin.

"Bacteria often develop resistance towards antibiotics within 48 hours after exposure," Associate Professor Velkov said. "The bacteria

failed to develop resistance towards this compound over 48 hours.

"These novel results will open doors to develop novel antibacterial drugs for the treatment of multi-drug resistant Gram-positive infections – bacteria with a thick cell wall – which are caused by certain types of [bacteria](#)."

More information: Maytham Hussein et al. The Killing Mechanism of Teixobactin against Methicillin-Resistant *Staphylococcus aureus*: an Untargeted Metabolomics Study, *mSystems* (2020). [DOI: 10.1128/mSystems.00077-20](#)

Provided by University of Melbourne

APA citation: A potential new weapon in the war against superbugs (2020, June 2) retrieved 8 May 2021 from <https://medicalxpress.com/news/2020-06-potential-weapon-war-superbugs.html>

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