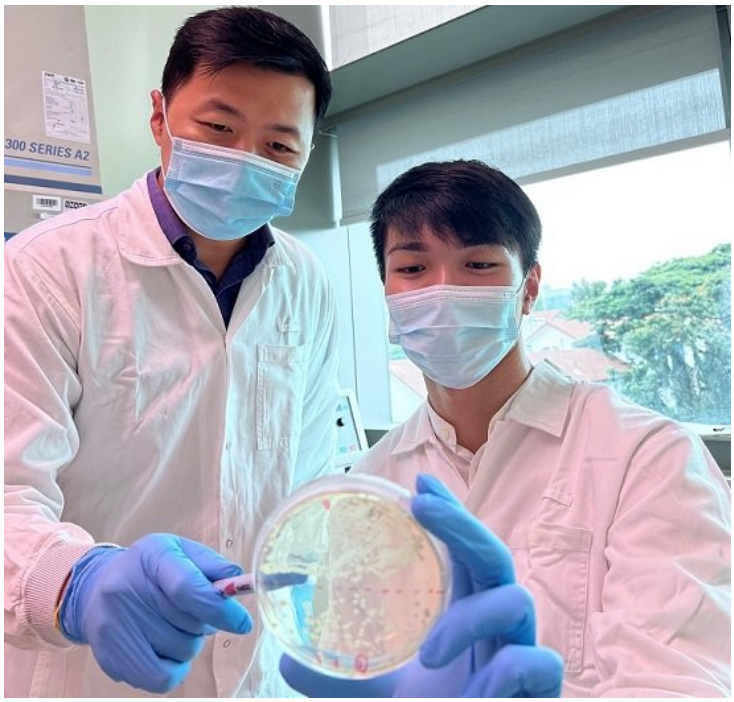
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Singapore researchers discover unique lysin against multidrug-resistant bacteria

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Novel lysin Abp013 has shown promising antimicrobial ability against Acinetobacter baumannii and Klebsiella pneumoniae



Caption: *SMART AMR researchers Boon Chong Goh (left) and Joash Chu (right) evaluate the effectiveness of lysins against Acinetobacter baumannii.*

Researchers from the Antimicrobial Resistance (AMR) Interdisciplinary Research Group (IRG) at Singapore-MIT Alliance for Research and Technology (SMART), MIT's research enterprise in Singapore, alongside collaborators at Nanyang Technological University, have identified a novel phage lysin – Abp013 – that could be used as an alternative antimicrobial agent against two of the most deadly bacteria: *Acinetobacter baumannii* and *Klebsiella pneumoniae*. The study is supported by the National Research Foundation (NRF) Singapore, under its Intra-CREATE Collaborative Seed Grant.

Lysins have been highly effective in fighting Gram-positive bacteria – which do not have an outer lipid membrane and thus easily killed by lysins. Conversely, in Gram-negative bacteria, the presence of an outer membrane impedes many lysins from killing the bacteria efficiently. Hence, the discovery of novel lysin Abp013 is crucial in the advancement of treatment methods against multidrug-resistant Gram-negative pathogens.

In a paper titled "*Novel Phage Lysin Abp013 against Acinetobacter baumannii*" published in medical journal *Antibiotics*, the SMART AMR team reveals their findings on Abp013's ability to effectively access and kill various bacterial strains. The study showed that Abp013 displayed good permeability and killing activity against multiple *Acinetobacter baumannii* and *Klebsiella pneumoniae* strains, even when they are in a more complex environment in which typical lysins are ineffective.

“Abp013 is the first Gram-negative lysin found to display host selectivity. Prior to the discovery of Abp013, no other lysins are capable of targeting *Acinetobacter baumannii* and *Klebsiella pneumoniae* but not *Pseudomonas aeruginosa*. Understanding the mechanism behind such selectivity will help guide the development of lysin variants customised to only target pathogenic bacteria, for more precise treatment of bacterial infections,” said Dr Goh Boon Chong, Principal Research Scientist at SMART AMR, and a co-corresponding author of the paper.

Researchers will further investigate the crystal structure of this novel lysin to discover additional antimicrobial components for drug-resistant bacteria.