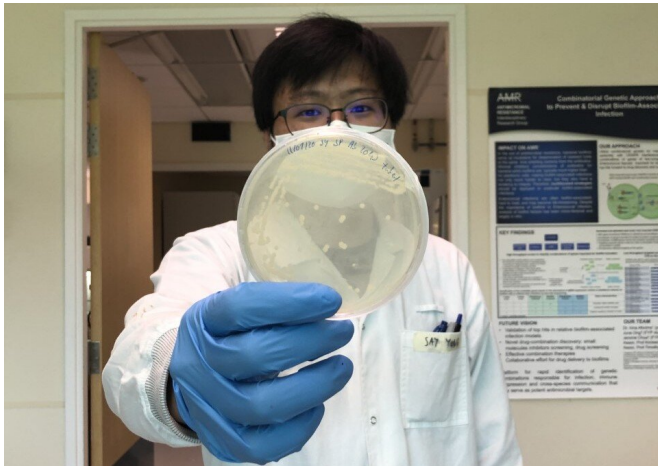


Researchers find new way to make bacteria more sensitive to antibiotics

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SMART AMR study finds that exposing bacteria to hydrogen sulfide can increase antimicrobial sensitivity in bacteria that do not produce H₂S Credit: Jessie Choo Hui Ling, SMART AMR

Researchers from Singapore-MIT Alliance for Research and Technology (SMART), MIT's research enterprise in Singapore, have discovered a new way to reverse antibiotic resistance in some bacteria using hydrogen sulfide (H₂S).

Growing antimicrobial resistance is a major threat for the world with a projected [10 million deaths each year by 2050](#) if no action is taken. The World Health Organization also warns that by 2030, drug-resistant diseases could force up to 24 million people into extreme poverty and cause catastrophic damage to the world economy.

In most [bacteria](#) studied, the production of endogenous H₂S has been shown to cause antibiotic tolerance, so H₂S has been speculated as a universal defense mechanism in bacteria against antibiotics.

A team at SMART's Antimicrobial Resistance

(AMR) Interdisciplinary Research Group (IRG) tested that theory by adding H₂S releasing compounds to *Acinetobacter baumannii*—a pathogenic bacteria that does not produce H₂S on its own. They found that rather than causing antibiotic tolerance, exogenous H₂S sensitized the *A. baumannii* to multiple antibiotic classes. It was even able to reverse acquired resistance in *A. baumannii* to gentamicin, a very common antibiotic used to treat several types of infections.

The results of their study, supported by the Singapore National Medical Research Council's Young Investigator Grant, are discussed in a paper titled "Hydrogen sulfide sensitizes *Acinetobacter baumannii* to killing by antibiotics" published in the prestigious journal *Frontiers in Microbiology*.

"Until now, [hydrogen sulfide](#) was regarded as a universal bacterial defense against antibiotics," says Dr. Wilfried Moreira, the corresponding author of the paper and Principal Investigator at SMART's AMR IRG. "This is a very exciting discovery because we are the first to show that H₂S can, in fact, improve sensitivity to antibiotics and even reverse [antibiotic resistance](#) in bacteria that do not naturally produce the agent."

While the study focused on the effects of exogenous H₂S on *A. baumannii*, the scientists believe the results will be mimicked in all bacteria that do not naturally produce H₂S.

"*Acinetobacter baumannii* is a critically important antibiotic-resistant pathogen that poses a huge threat to [human health](#)," says Say Yong Ng, lead author of the paper and Laboratory Technologist at SMART AMR. "Our research has found a way to make the deadly bacteria and others like it more sensitive to [antibiotics](#), and can provide a breakthrough in treating many drug-resistant infections."

The team plans to conduct further studies to

validate these exciting findings in pre-clinical models of infection, as well as extending them to other bacteria that do not produce H₂S.

More information: Say Yong Ng et al. Hydrogen Sulfide Sensitizes *Acinetobacter baumannii* to Killing by Antibiotics, *Frontiers in Microbiology* (2020). [DOI: 10.3389/fmicb.2020.01875](https://doi.org/10.3389/fmicb.2020.01875)

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