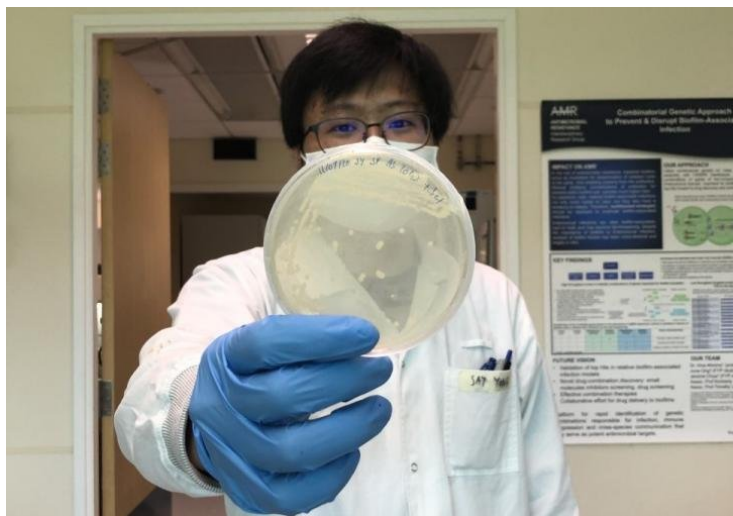


## Singapore's novel method makes bacteria more sensitive to Antibiotics

07 September 2020 | News

**SMART researchers study finds that exposing bacteria to hydrogen sulfide can increase antimicrobial sensitivity in bacteria that do not produce H<sub>2</sub>S**



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 (H<sub>2</sub>S).

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 Organisation 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 H<sub>2</sub>S has been shown to cause antibiotic tolerance, so H<sub>2</sub>S has been speculated as a universal defence mechanism in bacteria against antibiotics.

A team at SMART's [Antimicrobial Resistance](#) (AMR) Interdisciplinary Research Group (IRG) tested that theory by adding H<sub>2</sub>S releasing compounds to *Acinetobacter baumannii* – a pathogenic bacteria that does not produce H<sub>2</sub>S on its own. They found that rather than causing antibiotic tolerance, exogenous H<sub>2</sub>S sensitised 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 sensitises \*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 H<sub>2</sub>S 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 H<sub>2</sub>S on *A. baumannii*, the scientists believe the results will be mimicked in all bacteria that do not naturally produce H<sub>2</sub>S.

“*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 H<sub>2</sub>S.