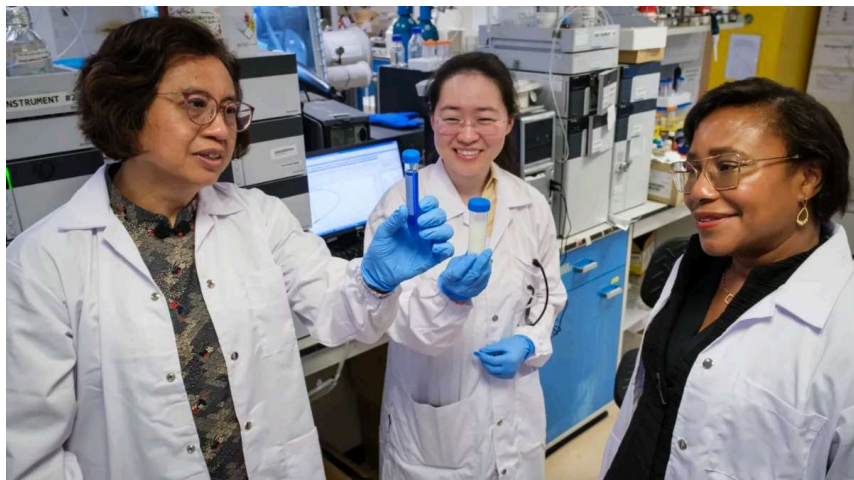


EXCLUSIVE

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*Prof Mary Chan, Dr Kaixi Zhang, Prof Paula Hammond (Photo from press release)*

NTU Singapore develops sustainable antimicrobial alternative for dairy farms

The new compound prevents udder infections in cows without antibiotics.

Scientists from Nanyang Technological University (NTU Singapore) and the Singapore-MIT Alliance for Research and Technology (SMART) have developed an antimicrobial compound that prevents bacterial infections in dairy cows without using antibiotics. The breakthrough offers a safer, more sustainable solution to bovine mastitis—a condition that costs the global dairy industry an estimated US\$22 billion (S\$28 billion) annually.

In preliminary farm trials, the compound, called *oligoimidazolium carbon acids* (OIMs), successfully prevented infections when applied to cow teats, without contaminating milk or irritating the animals. Unlike conventional antibiotics, OIMs destroy bacteria by converting into structures called carbenes, which penetrate microbial membranes and damage DNA—an approach that reduces the risk of resistance.

“Our study has unveiled an alternative class of potent antimicrobial compounds that could be used in agriculture to combat multi-drug-resistant bacteria that cause bovine mastitis,” said Professor Mary Chan, co-lead researcher from NTU Singapore and Principal Investigator at SMART AMR. “They didn’t spoil the cows’ milk nor make it unsafe for consumption as well.”

The biodegradable compounds break down into non-toxic molecules and remain effective even in the presence of milk, making them more environmentally friendly than traditional antiseptics such as iodine and chlorhexidine.

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Following early success, the team has launched large-scale trials in Malacca, Malaysia, with interest from agricultural firms in Australia, Belgium, Malaysia, and New Zealand. The researchers plan to commercialise the innovation through a spin-off company supported by Singapore’s National Research Foundation.

The study, published in *Nature Communications* on 12 July 2025, signals a major advance in sustainable dairy farming and could pave the way for broader biomedical applications.

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