Promising Agents Burst Through 'Superbug' Defenses To Fight Antibiotic Resistance

In the fight against "superbugs," scientists have discovered a class of agents that can make some of the most notorious strains vulnerable to the same antibiotics that they once handily shrugged off. The report on the promising agents called metallopolymers appears in the Journal of the American Chemical Society.

Chuanbing Tang and colleagues note that the antibiotic-resistant bacteria known as MRSA (methicillin-resistant Staphylococcus aureus) is responsible for a significant fraction of the infections that patients acquire in hospitals. According to the Centers for Disease Control and Prevention, MRSA usually spreads in hospitals when a health care provider with contaminated hands unknowingly passes it along to a patient. It can cause serious problems such as pneumonia, and can lead to death. One of the ways MRSA undermines conventional treatments is by producing enzymes that inactivate traditional antibiotics such as penicillin. Scientists have been developing new agents to combat these enzymes, but the agents so far have fallen short. Tang's team wanted to find a better alternative.

They tested a recently discovered class of metallopolymers — large, metal-containing molecules — against several strains of MRSA. When paired with the same antibiotics MRSA normally dispatches with ease, the polymer/antibiotic combo evaded the bacteria's defensive enzymes and destroyed its protective walls, causing the bacteria to burst. Also, the metallopolymers mostly left red blood cells alone, which suggests they might have minimal side effects. "These discoveries could pave a new platform to design antibiotics and antimicrobial agents to battle multidrug-resistant bacteria and superbugs," the researchers state.

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