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Poster abstract submission

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Poster title
A New Class of Antibiotics Overcomes Multi-Drug Resistant Bacteria by Targeting Outer Layer Glycolipid Biosynthesis

Poster abstract
Infectious diseases produced by multi-drug resistant (MDR) bacteria pose a significant challenge in global healthcare due to their capacity to evade treatment with antibiotics. MDR bacteria are exceptionally challenging to eradicate because their outer layers serve as significant impediments to antimicrobial agents. The impermeable characteristic of the outer layer arises from the presence of lipopolysaccharide (LPS) in Gram-negative bacteria, and lipoteichoic acid (LTA) in Gram-positive bacteria. Preserving the integrity of the outer layer is crucial for bacterial cell survival, and its compromise can heighten vulnerability to antibiotics. We present a novel class of antibiotics termed ASM, a functional amino acid drug class that inhibits the production of LPS or LTA by targeting the enzyme phosphoglucomutase (PGM) in bacteria. Notably, ASM exhibits enhanced bactericidal efficacy relative to the last-resort antibiotic colistin and successfully addresses clinically isolated carbapenem-resistant Acinetobacter baumannii (CRAB) in both in vitro and in vivo murine infection models, circumventing established antibiotic resistance mechanisms. Significantly, ASM also eradicates Gram-positive methicillin-resistant Staphylococcus aureus (MRSA) through the identical method of inhibiting PGM-mediated LTA production. Collectively, ASM signifies a possible therapeutic approach for patients with invasive infections caused by multidrug-resistant bacteria, such as CRAB and MRSA, for whom existing treatment options are insufficient, while also recognizing PGM as a viable target for antimicrobial drug development.

Research topic Small molecule therapeutics

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