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Poster abstract submission

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Poster title
MB1: a compound targeting of Pseudomonas aeruginosa surface attachment

Poster abstract
Bacteria commonly transition from a planktonic state to a surface-attached lifestyle, during which they undergo physiological adaptation. This process enables pathogens to become more virulent and promotes pathogenicity development. Despite its importance, surface adaptation has rarely been explored as a therapeutic target. Our lab has extensively investigated surface adaption of Pseudomonas aeruginosa, one of the most notorious opportunistic pathogens. P. aeruginosa exhibits surface-specific phenotypes that promote pathogenicity, including surface motility, contact-dependent virulence secretion, and biofilm formation. Therefore, disrupting surface-bacteria interactions could impair P. aeruginosa's surface-associated pathogenic phenotypes and ultimately alter infection progression.
Using an image-based screening assay, we identified a promising compound, MB1, that inhibits P. aeruginosa attachment. Our characterization showed that MB1 has a minimum effective dose of 12μM and maintains bacterial viability at concentrations up to 50μM. This suggests MB1 could potentially be employed as an anti-virulence drug, rather than an antibiotic, thereby limiting the emergence of resistant mutants. We performed extensive characterization of MB1 efficacy. The compound effectively reduced bacterial attachment to MDCK cells and decreased pathogenicity in macrophage infection assays, while showing no toxicity to host cells. Further investigations revealed that MB1 also inhibits attachment of other bacterial species, including Vibrio cholerae and Acinetobacter baumannii. These findings establish a foundation for developing next-generation anti-virulence therapeutics that target bacterial surface adaptation processes.

Research topic Small molecule therapeutics