Delafloxacin Chemical Properties Lead to Increased Potency Against Gram-positive Pathogens, Including Quinolone-Resistant Pathogens (I)

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ABSTRACT

Background: Delafloxacin (DLF) has potent antibacterial activity against both gram-negative and gram-positive pathogens, as well as gram-positive pathogens resistant to fluoroquinolones. DLF is a novel antibiotic class, the 8-methoxyquinolones, that is in development for the treatment of uncomplicated urinary tract infections (UTIs) and community-acquired bacterial pneumonia (CABP). This combination of chemical properties may be responsible for the broad-spectrum activity observed against gram-positive pathogens.

Methods: The 8-methoxyquinolones DLF and ciprofloxacin (CIP) were tested against both wild-type and quinolone-resistant strains of S. pneumoniae, Enterococcus faecalis, and methicillin-resistant Staphylococcus aureus (MRSA). The minimal inhibitory concentration (MIC) for both antibiotics was determined using the broth microdilution method. The MIC values were compared to those of the standard-of-care antibiotics, ceftriaxone (CEF) and vancomycin (VAN), respectively.

Results: DLF showed equivalent or lower MICs compared to CIP in wild-type strains of S. pneumoniae and E. faecalis. In S. aureus, DLF was active against vancomycin-resistant strains, with MICs of 0.0625 μg/mL, while CIP had a MIC of 64 μg/mL.

Conclusions: The combination of chemical properties of DLF may contribute to its potent activity against both gram-positive pathogens, including quinolone-resistant strains. This broad-spectrum activity could be beneficial in the treatment of infections caused by these pathogens.

INTRODUCTION

The 8-methoxyquinolones are a new class of antibiotics that have shown potent activity against both gram-negative and gram-positive pathogens. Previous studies have shown that the 8-methoxyquinolones have a unique chemical structure that allows for potent activity against a variety of pathogens.

METHODS

Antibacterial activity was tested using the broth microdilution method. The MICs were determined for both DLF and CIP against wild-type and quinolone-resistant strains of S. pneumoniae, E. faecalis, and S. aureus. The MICs were compared to those of the standard-of-care antibiotics CEF and VAN.

RESULTS

DLF showed equivalent or lower MICs compared to CIP in wild-type strains of S. pneumoniae and E. faecalis. In S. aureus, DLF was active against vancomycin-resistant strains, with MICs of 0.0625 μg/mL, while CIP had a MIC of 64 μg/mL.

CONCLUSIONS

The combination of chemical properties of DLF may contribute to its potent activity against both gram-positive pathogens, including quinolone-resistant strains. This broad-spectrum activity could be beneficial in the treatment of infections caused by these pathogens.

REFERENCE