Abstract

Antimicrobial agents binding to the pleomorphic clade are protein synthesis inhibitors that target the large subunits of ribosomal RNA. These agents block protein synthesis by binding to the 23S RNA in a complex with the 50S ribosomal subunit. The 23S RNA is highly conserved among bacteria, whereas the 16S RNA is highly variable. This high degree of conservation of the 23S RNA allows for the identification of potential targets for new antimicrobial agents.

Introduction

Antimicrobial agents targeting the ribosomal RNA subunit are currently in clinical use. However, the emergence of resistance to these agents has become a major concern. The development of pleuromutilins, a class of antimicrobial agents, has been limited by the high prevalence of resistance in several bacterial species, including Staphylococcus aureus. This study aimed to investigate the prevalence of resistance to pleuromutilins in S. aureus isolates from different geographic regions.

Methods

Bacterial strain collection. A total of 10,640 S. aureus isolates were recovered from various sources, including clinical specimens and food samples. The isolates were characterized using multilocus sequence typing (MLST) and pulsed-field gel electrophoresis (PFGE).

Screening for ribosomal target site mutations and resistance determinants. The ribosomal target site mutations were screened using multiplex PCR, followed by sequencing. Resistance determinants were screened using a combination of PCR and sequencing.

Results

Among 10,640 S. aureus clinical isolates recovered from the 2007 SENTRY program, 9.1% exhibited resistance to pleuromutilins. The resistance was distributed across different geographic regions, with the highest prevalence observed in Europe. The resistance was associated with mutations in the 23S RNA and the presence of resistance determinants, such as att554 and vga.

Conclusion

The prevalence of resistance to pleuromutilins in S. aureus isolates is high and varies by geographic region. Further studies are needed to understand the mechanisms of resistance and to develop new strategies for the treatment of S. aureus infections.