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Literature review on antimicrobial resistance and new therapeutic strategies: Development of new antibiotics, alternative therapies and antimicrobial stewardship programs in hospitals

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ABSTRACT

Antimicrobial resistance is a growing global health challenge, amplified by the indiscriminate use of antibiotics. This study reviews the development of new antibiotics, alternative therapies, and the implementation of antimicrobial stewardship programs in hospitals as crucial strategies to address this problem.

Keywords: Antimicrobial resistance, Antibiotic development, Alternative therapies, Antimicrobial stewardship.

INTRODUCTION

Antimicrobial resistance is defined as the ability of microorganisms, such as bacteria, viruses, fungi, and parasites, to resist the effects of antimicrobials, making treatments less effective or even useless (WHO, 2021). This phenomenon has intensified due to the inappropriate use of antibiotics in human medicine, veterinary medicine, and agriculture, leading to the development and spread of resistant strains and increasing the morbidity and mortality associated with infections (CDC, 2020). The implementation of antimicrobial stewardship programs in hospitals emerges as a strategic response to mitigate the effects of antimicrobial resistance. According to Dellit et al. (2007), antimicrobial stewardship refers to a set of coordinated measures to promote the rational use of antimicrobials, improve patients' clinical outcomes, and reduce the risks of antimicrobial resistance. These programs involve ongoing education of health professionals, the development and implementation of evidence-based prescribing guidelines, regular monitoring of antimicrobial use, and ongoing evaluation of outcomes. The development of new antibiotics remains crucial to fill the therapeutic gaps caused by antimicrobial resistance. As discussed by Rang and Dale (2019), research directed at the discovery of new antimicrobial agents is essential to ensure effective

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therapeutic options against resistant bacterial strains. In addition to conventional antibiotics, alternative therapies such as bacterial phages have shown promise in treating resistant infections. Smith et al. (2022) highlight that phage, viruses that selectively infect and destroy specific bacteria, offer a targeted and adaptive approach that can complement or replace traditional antibiotics in certain clinical scenarios.

DEVELOPMENT

DEVELOPMENT OF NEW ANTIBIOTICS

Advances in lipopeptide technology have been explored as a potential new class of antibiotics. Liu et al. (2021) discuss that these compounds may be effective against resistant bacterial strains, acting on bacterial cell wall synthesis and presenting a lower probability of inducing resistance compared to conventional antibiotics.

ALTERNATIVE AND COMPLEMENTARY THERAPIES

Bacterial phages have emerged as a promising alternative to traditional antibiotics. Studies reviewed by Smith et al. (2022) demonstrate its efficacy against multidrug-resistant bacteria, offering a specific and adaptive approach that can be customized according to the bacterial resistance profile.

ANTIMICROBIAL STEWARDSHIP PROGRAMS IN HOSPITALS

Implementing antimicrobial stewardship programs is essential to improve antimicrobial stewardship in hospitals. Dellit et al. (2007) emphasize that these programs not only promote the rational use of antimicrobials, but also contribute to the reduction of antimicrobial resistance, improving clinical outcomes and reducing costs associated with resistant infections.

DISCUSSION

The integration of new antibiotics, alternative therapies, and antimicrobial stewardship programs offers a comprehensive, multifaceted approach to addressing antimicrobial resistance. These strategies not only aim to improve therapeutic outcomes but also promote the long-term sustainability of antimicrobial treatments.

CONCLUSION

In conclusion, antimicrobial resistance poses a significant challenge to global health, requiring coordinated and innovative approaches. The continued development of new antibiotics, along with the promotion of alternative therapies and the effective implementation of antimicrobial stewardship

programs, are critical to mitigating the adverse impacts of this crisis and ensuring the effectiveness of future antimicrobial treatments.

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