

Molecular Microbiology and Microbial Physiology

P-296 - ASSESSMENT OF THE BIOTIC EFFECTS OF CEPHALEXIN ON CLINICAL STRAINS OF STAPHYLOCOCCUS AUREUS AND ENTEROCOCCUS FAECALIS ISOLATED FROM A POLYMICROBIAL INFECTION

Joana Freitas Da Silva^{1,2}; Ângela S. Inácio^{2,3}; Nânci Ferreira^{2,3}; Paulo Martins Da Costa^{2,3}

1 - Escola Superior de Biotecnologia, Universidade Católica Portuguesa, Porto, Portugal; 2 - Departamento de Produção Aquática, Instituto de Ciências Biomédicas Abel Salazar (ICBAS), Universidade do Porto, Porto, Portugal; 3 - Centro de Investigação Marinha e Ambiental (CIIMAR), Universidade do Porto, Porto, Portugal

Abstract

Even though polymicrobial infections are very common, their study is still at an early stage. In these infections, particularly when biofilms are formed, microorganisms establish a complex network of interactions that play an important role in the severity and progression of disease, with consequences in virulence, in the immune response and in the effectiveness of antimicrobial therapy. In an era in which resistance to antimicrobials is an alarming and rapidly expanding scenario, the choice of appropriate treatment is paramount, with consequences in preventing the development and spreading of resistances.

The biotic interactions between strains of *Staphylococcus aureus* and *Enterococcus faecalis* in the presence of cephalexin were studied, both in the planktonic state and in biofilms. The strains were selected from a collection of veterinary clinical isolates. The studies were conducted for single-species or dual-species combinations and at two time points: 6h and 20 h. The viability of cells in the planktonic phase was determined by culture-dependent methods and the cellular viability of biofilms was evaluated through metabolic activity quantification and Live/Dead staining. The biofilm-forming capacity of the tested strains was quantified, as well as their matrix production.

Results & Conclusions

We showed that co-culturing the two strains in the presence of cephalexin benefits the most sensitive (*S. aureus*) in a greater extent than the resistant one (*E. faecalis*). In fact *S. aureus* were able to survive and were culturable when co-exposed to concentrations of cephalexin higher than their minimum inhibitory concentration. The biofilm-forming capacity of the most sensitive strain is affected in the same manner, however at an early stage of biofilm formation both strains benefit from being in co-culture. Exposure to cephalexin caused changes in the morphology of the strains.

References & Acknowledgments

This work was partially supported by the project INNOVMAR - Innovation and Sustainability in the Management and Exploitation of Marine Resources (reference NORTE-01-0145-FEDER-000035, within Research Lines NOVELMAR and INSEAFOOD), supported by North Portugal Regional Operational Programme (NORTE 2020), under the PORTUGAL 2020 Partnership Agreement, through the European Regional Development Fund (ERDF).

Keywords: Polymicrobial infections, Biofilms, Antimicrobial resistance, Cephalexin, *Staphylococcus aureus*, *Enterococcus faecalis*