Università degli Studi di Napoli Federico II

PhD in Biotechnology - 39th cycle

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Innovative strategies for prevention and treatment of microbial biofilms in the industrial and medical fields

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Biofilm is the oldest most successful and most widely distributed form of life on earth, it is defined as an aggregate of microorganisms embedded in an extracellular polymeric matrix produced by bacteria to escape harsh environmental conditions and antibacterial effects[1]. Due to the protective nature of biofilms bacteria living inside the biofilm communities are often resistant to antibiotics[2]. For these reasons, new approaches are needed to make antimicrobials more effective, biocompatible, environmentally friendly, cost-effective, and long-lasting[3]. An innovative approach could be the use of antibiofilm molecules to increase the effectiveness of traditional antibiotics and to prevent the biofilm formation of different pathogenic strains. Microorganisms able to thrive in harsh conditions, like in Antarctica, resulted to be a good source of different new molecules including antibiofilm agents[3]. This research project aims to harness antibiofilm molecules derived from Antarctic marine bacteria for a dual purpose. Firstly, to prevent *S. epidermidis* infections by creating new antibiofilm materials suitable for medical device design. Secondly, to enhance the efficacy of antibiotics against ESKAPE pathogens in existing infections adding the antibiofilm molecules to the traditional antibiotic treatments.

References

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