Research Doctorate (Ph.D.) in Chemical Sciences
32nd Cycle – Academic Year 2016/2017

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Project Information

1 -Title

Investigation of the molecular mechanisms involved in bacterial biofilm formation

2 - Key words

Bacterial Biofilms
Functional proteomics
Antimicrobial Peptides
Molecular mechanisms
Mass Spectrometry

3 - Abstract

Microorganisms have the extraordinary ability to live almost any environment through sophisticated survival mechanisms such as biofilm formation. Biofilms consists of a complex microbial community adhering to biotic or abiotic surfaces and enclosed within a protein/polysaccharide self-produced matrix. The organization of the matrix gives antibiotics resistance to bacteria, protection from external environment and from the immune system. Therefore, biofilm formation constitutes a fondamental problem in a large variety of different fields such as health, food preservation and environment, representing a crucial point for pathogenicity development.

This PhD project focuses to the study of the molecular mechanisms involved in the formation of bacterial biofilms by exploiting both functional and differential proteomics procedures to identify key proteins involved in biofilm formation. The same approaches will be employed to investigate proteins occurring in the OMV vesicles, responsible for the exchange of genetic and proteic material within the biofilm, and to elucidate the mechanism of action of antimicrobial peptides.