9th Workshop on Artificial Organs, Biomaterials and Tissue Engineering

OBI - ARARAQUARA

This short course provides a comprehensive overview of microbial biofilms, covering their formation, architecture, and physiology, as well as their implications for biomaterials and medical devices. Particular emphasis will be placed on the clinical and industrial challenges associated with antimicrobial tolerance and resistance. The course is structured into theoretical lectures and a hands-on practical session focused on laboratory methods for the quantification and characterization of biofilms.

Objectives

- Understand the mechanisms involved in the formation and maturation of microbial biofilms on biological and synthetic surfaces.
- Analyze the clinical and technological impacts of biofilm development in biomaterials and tissue engineering systems.
- Become familiar with quantitative and qualitative methodologies for biofilm analysis, including assessments of viability, biomass, and antimicrobial susceptibility.
- Develop practical skills for performing laboratory protocols applied to biofilm research and control.

Course Structure

The course will include theoretical lectures (4 hours total) and a practical laboratory session (4 hours total) dedicated to biofilm quantification and characterization techniques.

The theoretical component will cover the following topics:

- Biofilm Formation and Architecture;
- Biofilm Tolerance and Resistance;
- Control Strategies and Emerging Approaches.

During the practical component, participants will gain hands-on experience with methodologies for:

- Biofilm cultivation and viable cell quantification;
- Metabolic activity assessment;
- Biomass evaluation;
- Biomaterial screening techniques.

Expected Outcomes

- Ability to identify and apply appropriate biofilm analysis techniques.
- Understanding of the advantages and limitations of different analytical methods.
- Critical interpretation of experimental results in clinical and industrial contexts.
- Development of adaptable protocols suitable for different types of biomaterials.