Group : Interactive Surfaces
Project : **Development of Stable and Antifouling Coatings for Biosensors**
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Introduction

Antifouling coatings play a crucial role in preventing undesired fouling (Figure 1). Those composed of zwitterionic polymers exhibit remarkable superhydrophilicity attributed to the abundance of cations and anions along their polymer chains. The hydration layer surrounding these polymers effectively hinders the adsorption of proteins and other species, rendering them highly effective under physiological conditions.

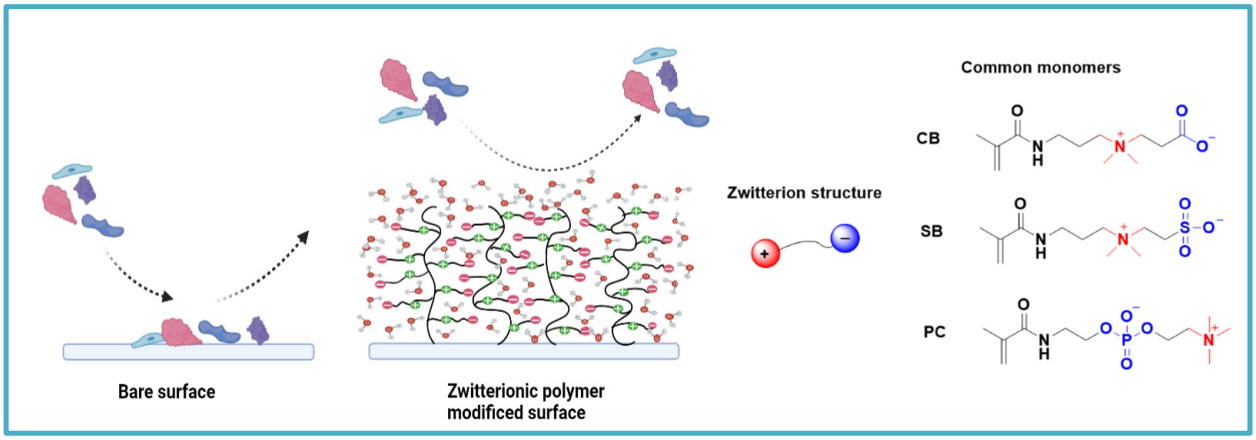

Figure 1: Schematic representation of biofouling on bare surfaces and zwitterionic polymers modified surfaces, and commonly used monomers.

In this research project, the primary focus will be on developing stable and robust antifouling coatings compatible with complex matrices. The project is organised into two main stages:

1) synthesis of stable anchoring molecules,
2) formation of zwitterionic antifouling coatings, along with the characterisation of modified surfaces.

In the first stage, students are tasked with designing the structures and synthetic protocols for the target anchoring molecules, followed by organic synthesis to obtain the desired molecule(s). In the second stage, surface modification and subsequent "grafting-from" polymerisation will be executed, and the modified surfaces will be characterised using various techniques such as water contact angle measurements, ellipsometry, XPS, AFM and IRRAS, QCM-D, and SPR.

Techniques to be used

- General organic/polymer synthetic techniques such as TLC, column chromatography, NMR, and MS
- Surface modification and surface characterization techniques such as water contact angle measurements, ellipsometry, XPS, AFM and IRRAS, QCM-D, and SPR.

More information

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