Group : Microfluidics and Biosensors
Project : **Bioactive surfaces for smartphone bases biosensors**
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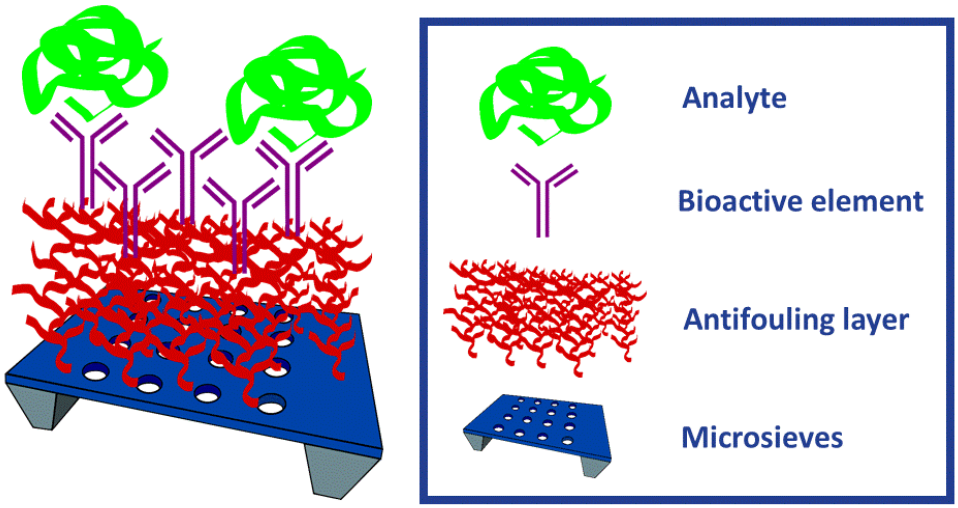
Introduction

Direct detection platforms to recognize small amounts of contaminants and allergens in foods or biomarkers in blood sera are essential tools in the food industry and medical diagnostics, respectively. A large number of detection techniques is currently available for this, but the signal/noise ratio is often not limited by the signal anymore, but by the noise. This is largely due to the non-specific adsorption of proteins on the detecting surfaces, i.e. fouling, and leads to both false positive and false negative results.

Goal

The aim of the research project is to create a new approach for the design and development of bioactive surfaces, while avoiding the fouling thereof. In this project we focus on microsieve-based biosensors, which is made of an ultrathin (~1 µm) yet very strong membrane. New synthetic pathways will be investigated for the construction of such surfaces, specifically including highly novel photoinitiated controlled polymerization techniques for the synthesis of anti-fouling polymer brushes. After proof-of-principle demonstrations on demo surfaces, the sensitivity and selectivity will be studied in microsieve-based devices by optimizing the binding of bioactive elements to the antifouling polymer layer, and study of the capture of the desired analytes.



Techniques to be used

Photochemical surface-initiated controlled radical polymerization techniques will be used as main method to create antifouling surfaces. A range of click chemistries and active ester coupling will be used for bioconjugation of biological active elements on the antifouling layers.

Surfaces characterization techniques: AFM, XPS, Contact angle, fluorescence microscopy, and optical microscopy.
Synthetic chemistry: synthesis of polymer brushes, multistep synthesis, purification, NMR, IR.

For more information:

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