

Development of a flow-sensitive biosensor for multiplexed measurement.

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Goal: The aim of the project is to investigate the response due to the binding of biomolecules on the surface of the sensor by changing the surface material.

Background: Recently our group has achieved a working microcapillary based biosensor that is fabricated on a chip as shown in figure 1. Using the experimental set-up as shown in figure 2, the experiment was carried out for the preliminary detection of a common biomolecule such as avidin and was found to be sensitive. At a concentration of 9 nM, the sensor could detect the presence of biomolecules on the surface of the capillary as shown in figure 3.

In this project, the microfabricated electrokinetic sensors will be used for the detection of biomolecules such as Herceptin and the sensitivity towards the surface material will be investigated. In order to detect these biomolecules, a method of measuring streaming current due to a change in the pressure of the fluid is used. The chip contains three to four sensors in parallel and could be used simultaneously. One of the aims of the project is to achieve the simultaneous detection of several biomolecules in order to achieve a multiplexed detection scheme.

The candidate is expected to be good in the hands-on characterization of sensors and should have a physics/materials/electronics background. Studies in microfabrication will be an added advantage. Based on the candidates' interest and background, the project can be narrowed down to a specific task.

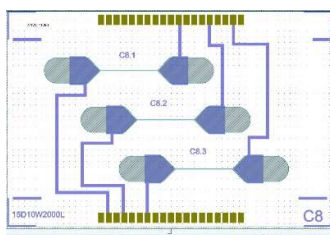


Fig 1: Schematic of a microfabricated chip containing three biosensors.

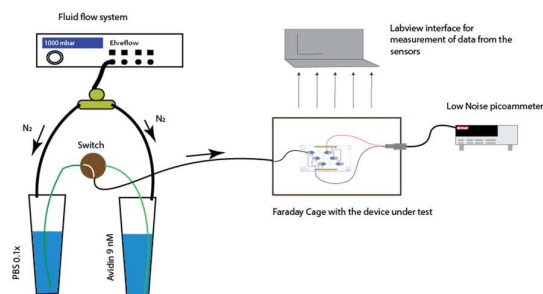


Fig 2: Experimental set-up for calibrating the biosensor.

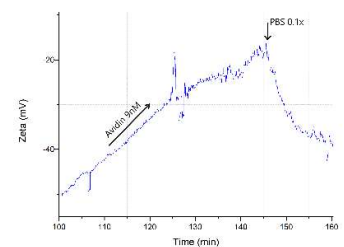


Fig 3: Graph showing the detection of avidin at 9 nM concentration.