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Group: Organic Chemistry
Project : Development of a sensor for the detection of biomarkers linked to human depression
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Fields of interest: Antibody microarrays, microscale surface patterning, bioconjugation, SiO₂ surface chemistry
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Introduction

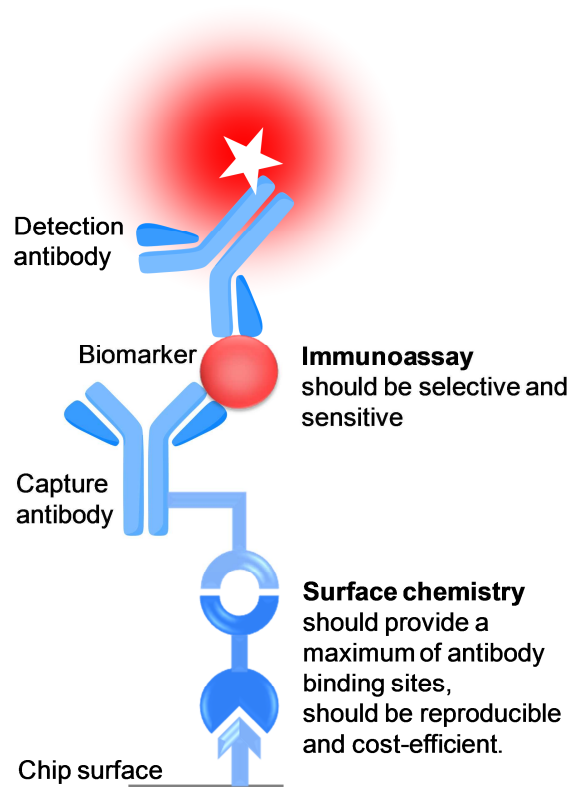
Depression will be in 2020 the most incapacitating disease after cardiovascular problems, according to the World Health Organization (WHO). The current diagnosis of depression is only based on what patients say, and it takes a long time to figure out whether the prescribed antidepressants are adequate. Therefore, a rapid and efficient diagnosis is needed.

Biomarkers for depression have recently been identified. They are proteins which, in certain concentrations, could indicate the presence of the disorder. The idea is to develop a sensor which would detect several of these biomarkers in blood, plasma or urine samples for an easy, objective and reliable diagnosis of depression.

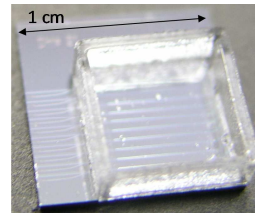
Goal

The biosensor is based on a novel microarray technology, in-plane parallel scanning.[1] The biomarkers will be detected by means of a fluorescence-based sandwich immunoassay, on the glass surface of an integrated optical waveguide chip.

There are several challenges in this project, including: oriented immobilization of antibodies for a high sensitivity, patterning of different antibodies (up to 10) on the same surface for multiplex sensing, and optimization of the sandwich assay for biomarker detection.



Technology
Patterning antibodies
on 80 μm -wide
sensing wells



Surface chemistry
should provide a
maximum of antibody
binding sites,
should be reproducible
and cost-efficient.

References

- [1] Duer, R.; Lund, R.; Tanaka, R.; Christensen, D. A.; Herron, J. N. *Analytical Chemistry* 2010, 82, 8856.