

# Liquid Chromatography/on-chip-electrochemistry/ mass-spectrometry in (bio) analytical chemistry, drug metabolism and proteomics

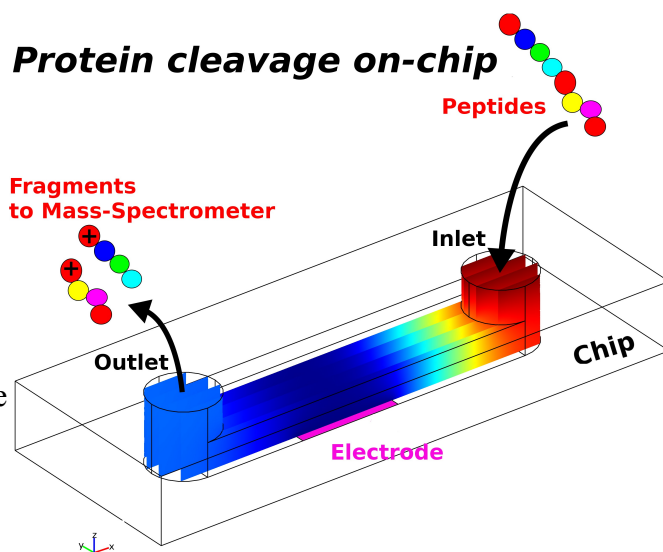
## Introduction

In this project, the goal for BIOS is to develop a miniaturized electrochemical cell for on-line use with liquid chromatography and mass-spectrometry. Four different groups from four different fields of research work in a cooperative project funded by Dutch Technology Foundation STW (Stichting voor de Technische Wetenschappen). In (bio)analytical chemistry, pharmaceuticals and proteomics, tools like liquid chromatography (LC) and mass spectrometry (MS) are frequently used. LC and MS are often combined with electrochemical cells used for different kinds of electrochemical conversions, which is also the common denominator in this project.

In mass spectrometry only charged species can be detected. Therefore, electrochemical conversions are used (among other methods) in (bio)analytical chemistry to provide charge to otherwise neutral molecules.

Electrochemical oxidation of pharmaceuticals can be used to mimic the metabolic pathways occurring in the body. Electrochemical oxidation of pharmaceuticals is a way to accelerate *in vitro* tests for new potential drug candidates.

Protein digestion and subsequent analysis of the resulting peptide mixture by mass spectrometry has become a powerful method for protein identification used especially in proteomics. Protein digestion or cleavage is done traditionally by enzymatic or chemical means. Important for the cleavage is the specific position at which the proteins are cleaved. Also, the cleavage must not produce unwanted, unspecific side-products. Electrochemical cleavage might prove to be an attractive alternative.



## Project goals

BIOS – the lab on a chip group – is specialized in designing and fabricating microfluidic chips for biomedical applications. In this project, the goal is to develop a miniaturized electrochemical cell for on-line use with LC and MS. Miniaturization is beneficial, because of the increased surface to volume ratio. Therefore high turnover-rates for electrochemical conversions and protein cleavage can be achieved. This electrochemical cell will be used to obtain analytical results in the previously mentioned topics of research: (Bio)analytical chemistry, pharmaceuticals and proteomics.

## Funding

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**Interested?**

If you are interested and for instance would like to do your (master or bachelor) graduation work or practical term, please contact via the email address below.

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