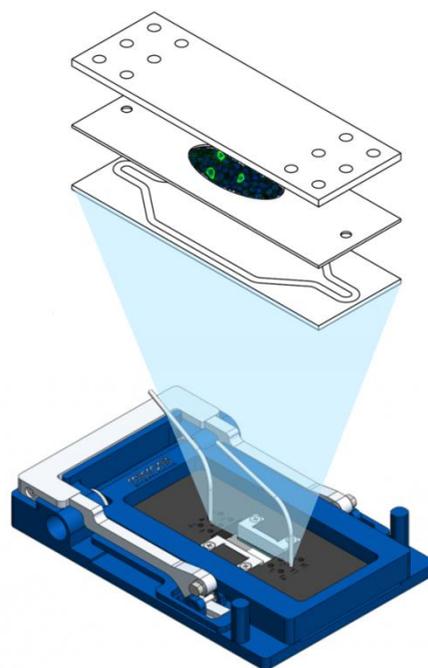


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Project	High-end Analytical Detection coupled to a Gut-on-a-Chip
Fields of interest	Mass spectrometry, analytical chemistry and microfluidics
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Introduction

The lack of predictive validity of current *in vitro* models is becoming problematic for the safety assessments of chemicals (i.e. REACH, ECHA), in the development (lead finding) of beneficial ingredients (EFSA) and drugs (EMA, FDA). Conventional models, either animal models or *in vitro* models do not adequately represent human organ functioning. Recent advances in microchip- and bioengineering allowed to develop unprecedented organ-on-a-chip models that recapitulate the dynamic physical and functional features of human tissues within their biological microenvironment. Microfluidic-gastrointestinal-chip (GUT) models are the heralds of a technological revolution that will result in a complete, realistic and empiric pharmacokinetic model of the human body. To really advance the applicability of the GUT models they need to be integrated with advanced sample preparation and analytical technologies to identify and quantify the active compounds and metabolites, if formed. The small dimensions of microfluidic devices have the ability to handle mass limited analyses with low reagent consumption, and integrated multiple processing steps into a single system. On the other hand it is highly demanding for the analytical instrumentation in terms of sensitivity, and small sample volumes. The ultimate goal is to meet the demands of high throughput sample analysis such as proteomics workflows for organ-on-a-chip applications.



Keywords: organ-on-a-chip, microfluidics, LAESI-MS, ICP-MS, MALDI-MS, ESI-MS, nanoparticles, alternative testing, toxicology

Aim

In this project sensitive, selective mass spectrometry detection platforms will be coupled to compartmentalized microfluidic-gastrointestinal-chips. This results in a total analysis system that is ideally positioned to replace animal trials.

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