# Fabrication of microfluidic tools for manipulation and analysis of (single) cells

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### Organisation

**Name of the organisation** Katholieke Universiteit Leuven (KUL)

**Department** Department of Biosystems - Biosensors group

**Country** Belgium

**Geographical Area** Flemish Region

## SCOPE OF THE METHOD

| | |
|---|---|
| **The Method relates to** | Animal health, Environment, Human health |
| **The Method is situated in** | Basic Research, Translational - Applied Research |
| **Type of method** | In vitro - Ex vivo |

## DESCRIPTION

### Method keywords

Microfabrication

Molding

Imprinting

Single cell manipulation

Single cell analysis

High-throughput

### Scientific area keywords

Lab-on-a-chip

Droplet-based microfluidics

Digital microfluidics
Optical tweezers
Microwell arrays
Single cell studies

### Method description

Design and fabrication of microfluidic devices that allow manipulation and analysis of (single) cells. Droplet-based as well as digital microfluidics can be applied and are suitable for a wide variety of (non-adherent) cells. Different materials can be used for the fabrication of the microfluidic devices (PDMS, OSTE+, glass combined with Teflon, ...), depending on the type of microfluidics required and their compatibility with the cells. Interesting (single) cells, seeded in either droplets or microwells, can be manipulated and collected for analysis, e.g. based on their reaction towards certain stimuli. As such, these platforms have been used already for, among others, cytotoxicity studies of single yeast cells and manipulation of single human cells using optical tweezers to allow sequencing on the single cell level.

### Method status

Still in development
Published in peer reviewed journal

## PROS, CONS & FUTURE POTENTIAL

### Advantages

Microfluidic-based manipulation and analysis of cells allows high-throughput (single) cell studies with low sample and reagent consumption. Cells of interest can be collected easily in order to enable further analysis on the single cell level, thereby revealing new insights in cell behavior or composition.

### Challenges

Most current microfluidic setups still require additional devices for liquid manipulation, such as microfluidic pumps, and signal analysis, such as microscopes. Nevertheless, for studies performed in a research environment, several easy-to-use devices are readily available.

### Modifications

The microfluidic devices can be designed to fit the specific needs.

## REFERENCES, ASSOCIATED DOCUMENTS AND OTHER INFORMATION

### Links

Website KU Leuven - Biosensors group

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