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

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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
This method makes use of	Other (e.g. bacteria): Several types of cells can be manipulated and studied, ranging from bacterial cells to yeast cells, animal cells and even human cells

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.

Lab equipment

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

Associated documents

Links

Website KU Leuven - Biosensors group

PARTNERS AND COLLABORATIONS

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