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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