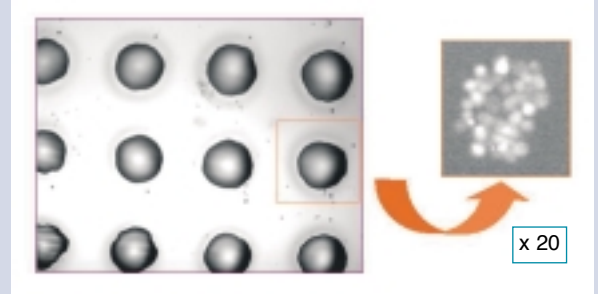


Phenotypic analysis on a chip

Miniaturised technologies for phenotype-based cell analysis. Experts network in biotechnology and cell biology.

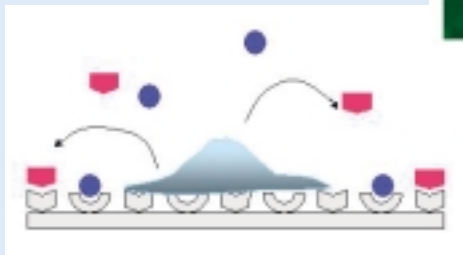
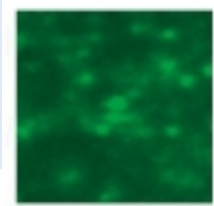
This exploratory project proposes a new biochip device which allows molecular screening in cell drops. By cultivating eukaryotic cells in individual microdrops, multiple cell types can be phenotypically characterised under various molecular stimulations. In the drops the cells can be either adherent to the substrate or be kept in suspension. Cells are analysed by fluorescence after stimulation with drugs, nucleic acids or proteins.



Cell culture in 500µm drops on a glass slide. In each drop, the HeLa cells are cultivated for 2 days before analysis of cell viability using acrydine orange.

Surface functionalisation with a molecular array

3T3 fibroblasts transfected in drop using a GFP plasmid. Fluorescence was analysed by scanning two days after the cell transfection (scan precision: 1µm)



Cell secretions analysis using antibodies: grafted in the vicinity of the cell

Cells are kept alive in drops on the array of the patterned molecules. We are particularly interested in:

- 1) **Antibodies:** we are working on biochips allowing the detection of cell secretions (for example, simultaneous detection of several cytokines).
- 2) **Nucleic acids:** the automation of the transfection allows the selection of optimal sequences for gene expression as well as for gene silencing. The transfected cells are kept alive on the chips until their new phenotype is analysed.
- 3) **Small molecules:** chemical libraries and cells are patterned on the same substrate in order to miniaturise a high throughput screening device.

Fields of application

- Phenotypic screening
- HTS cytotoxicity
- Diagnostics
- siRNA for gene silencing optimisation
- Functional genomics

Partners :

CEA/DSV: coordination of the project and biotechnological integration.
CEA/Leti : technological solutions for the biochips substrate fabrication.
INSERM and CNRS : biological models.

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