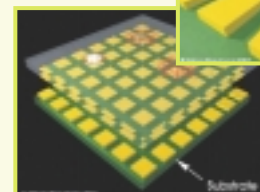
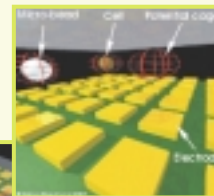


# The european MeDICS project: a miniaturized cell sorter

## Principle: cell levitation and sorting by reconfigurable 3D dielectrophoretic cages

Partners of the MeDICS project are validating a multiplexed electrode array to perform Single Cell levitation, motion in all directions and analysis. By applying critical electrical fields to the array, cells (a few tens of microns in diameter) are trapped in 3D cages (dielectrophoretic cages) with no mechanical contact. The aim is to show that the device opens new fields of analysis for rare cell populations (such as biopsy analysis, stem cell sorting and recovery for cell therapy applications) and enables independent and parallel single cell manipulation.



## Advantages

**Cell-friendly:** dielectrophoretic fields are compatible with cell viability. Manipulation is carried out with no mechanical contact.

**Flexibility:** The cell traps can be reconfigured at will.

**Motion:** Software control enables independent cell motion in all directions for thousands of cells with no fluid flow.

## Prototype for individual cell levitation and motion

The MeDICS-01 prototype is a 320 x 320 electrode matrix (ie : over 100 000  $20\mu$  electrodes) covering  $0.4\text{cm}^2$ . The matrix can generate thousands of independent cages and independent motion is controlled by a software interface. Sorted cells may be directed towards various compartments on the chip for further analysis and manipulation (drug delivery, liposome fusion, gene transfection..) or towards other CellOnChip devices.

## Applications

- Analyzing and sorting small and rare cell samples (stem cell research , surgical biopsies)
- Gene and Cell therapy
- Individual analysis & Single cell manipulation
- Cell to Cell interactions



## European partners and their area of expertise

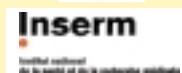
The MeDICS project has obtained a 2 year funding in « Future Emerging Technologies ». Contract n° IST-2001-32437: kick off 1st of Nov 2001

**Silicon Biosystems** (coordinator) and **ARCES** (University of Bologna) are in charge of silicon and control board design and software.

The **CEA/Leti** brings microfluidic design and packaging process development

The **CEA/DSV** addresses biocompatibility issues, biological integration and experiments on cell populations

The **Inserm** brings relevant biological and clinical models and evaluates the performance of the microsystem.



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