

# MICROFLUIDIC CHIP, PROCEDURES AND USES

## ABSTRACT

The present invention belongs to the technical field of microfluidic devices for the culture of cellular samples, known as “lab-on-a-chip”

Specifically, the invention refers to a chip comprising a plurality of compact microfluidic valves with multiple entrances and exits, controlled by a system of flexible membranes.

The invention also refers to a procedure to manufacture the chip and its uses.

It was developed by researchers belonging to the University of Zaragoza, the Technological Institute of Aragón, and the Biomedical Research Networking Centre in Bioengineering, Biomaterials and Nanomedicine (CIBER-BBN).

## DESCRIPTION

The invention refers to a microfluidic chip specially oriented to culture and study cellular samples.

An object of the present invention is obtaining microfluidic chips with a high capacity of miniaturization, and with effective valves and pumps.

This object is achieved by means of a manufacturing procedure.

This chip comprises a plurality of chambers for said samples, several channels for fluids circulation, and corresponding valves, operated by the deformation of a sealing layer. This network form a layer, and one or several layers form the structure of the chip.

The sealing deformable layer is made of flexible, elastic, and insulating material, preferably transparent to allow the microchambers to be observed under the microscope. When it is pressed, one or more channels are closed. Preferably, each valve is operated independently.

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## APPLICATIONS

- Cell culture in microfluidic circuits
- Microfluidic pumps
- Valves kit

## DEVELOPMENT STATUS

Developed

## IP STATUS

Patent pending

## AVAILABLE FOR

- Exclusive license agreement
- Non-exclusive license agreement
- Further research or development

## INDUSTRIAL PROPERTY

Spanish Patent Application  
**P201531539**, filed on October 27,  
2015

## TECHNOLOGICAL OFFER

## INNOVATIVE ASPECTS AND ADVANTAGES

- Novel procedure of manufacture
- Very small chip size (1 cm<sup>2</sup> surface)
- Diameters of chambers between 1 and 2 mm
- Miniaturization of chambers up to tens of micrometer
- Number of chambers and valves as desired
- Independent opening and closing of different circuits
- No join leakage
- Independent systems and functions
- Programmable
- Wireless system of control
- Modular
- Portable
- Scalable
- Different materials can be used for its manufacture
- High manufacturing capacity
- Simplification of electrical parts
- Rechargeable battery or electrically driven
- Low use of energy

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