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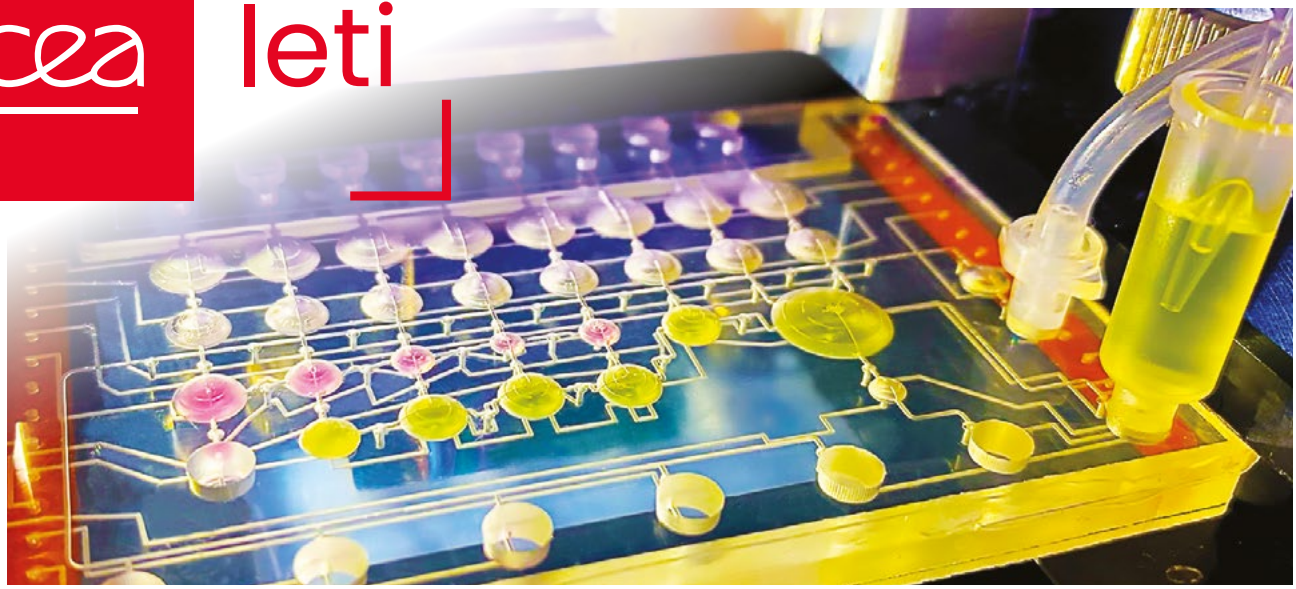


Flowpad-Flowstretch

PATENTS 10 PATENTS

A generic toolkit for microfluidics and point-of-care diagnostics

What is it

FlowPad is an instrument enabling the use of disposable, credit card format microfluidic cartridges with fluidic channels designed to perform a selection of tests outside of a traditional lab environment. The integrated protocol can be complex by including all sample preparation steps—concentration, lysis, purification—as well as bio-analysis and detection procedures—qPCR, RPA, LAMP and ELISA.

The FlowPad instrument is an advanced chip carrier that can operate a dedicated microfluidic cartridge. It integrates actuators, a Peltier heater, magnetic actuators and on-board reagent recovery, as well as an optical sensing system and associated software programs.

The consumable microfluidic cartridge can integrate valves, pumps and mixing chambers. In particular, the patented FlowStretch technology enables precise and complex protocols in very small volumes, using stretchable chambers activated by pneumatic actuators.

FlowPad and FlowStretch are an innovative point-of-need toolkit able to deliver a diagnosis.

What it can do

Flowpad-Flowstretch finds applications in human medicine, agri-agro and environment industries:

- Sample preparation at the sampling point—peptide, isolation
- Fluidic circuit board for integrating modularity in organ-on-chip developments
- Point-of-care testing and diagnostics—bacteria, viruses, biomarkers and proteins
- Companion diagnostics
- Specific Flowpad: cell encapsulation
- Assessment of Chemical, Biological, Radiological and Nuclear (CBRN) risks;
- Specific Flowstretch: ELISA.

When applications require a very fine control of volumes, Flowpad is particularly differentiating.

What makes it unique

CEA-Leti's Flowpad-Flowstretch microfluidic technologies open a new path to the future of testing:

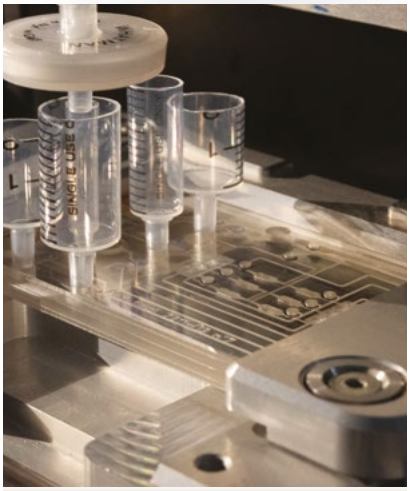
- Tests in less than 2 hours: from raw biological sample to results
- Versatile, easy-to-use toolbox
- Compatible with multiple complex protocols—biological, chemical, etc.—and materials—silicon, glass, COC, polymers, etc.
- Reduces development and prototyping time
- Easily scalable for high-volume production at low-cost. CEA-Leti has perfected cartridge design and small-scale production.
- Full protocol integration

Flowpad-Flowstretch toolkit:

- Has user-friendly features, plug-and-play fluidic connections with easy and efficient flow control
- Operates with valves and a pump integrated into the cartridge
- Are compatible with injection molding

Publications

- **A versatile and automated microfluidic platform for a quantitative magnetic bead based protocol: application to gluten detection.** C.Parent, P.Laurent, C. Goujon, X. Mermet, A.Keiser, F.Boizot, R.Charles, L.Audebert, Y.Fouillet, M. Cubizolles.
- **Microfluidic device integrating network of hyper-elastic valves for automated glucose stimulation and insulin secretion collection from a single pancreatic islet.** C. Quintard, E. Tubbs, J.-L. Achard, F. Navarro, X. Gidrol, Y. Fouillet
- **PepS: An Innovative Microfluidic Device for Bedside Whole Blood Processing before Plasma Proteomics Analyses.** B. Gilquin, M. Cubizolles, R. Den Dulk, F. Revol-Cavalier, M. Alessio, C.-E. Goujon, C. Echampard, G. Arrizabalaga, A. Adrait, M. Louwagie, P. Laurent, F. Navarro, Y. Couté, M.-L. Cosnier, V. Brun



What's next

CEA-Leti is currently working in scaling to high-volume manufacturing both the cartridge and the instrument with industrial partners.
Next improvement: multiplex measurement.

Interested in this technology?

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