



Flowpad-Flowstretch

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

What is Flowpad-Flowstretch?

FlowPad features 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.

An instrument leverages a chip carrier, a functional implementation system based on the microfluidic cartridge design. This instrument integrates a valve, a pump and a mixing chamber and is embedded into a toolkit. This toolkit delivers the diagnosis. It integrates actuators, a Peltier heater, magnetic actuators and on-board reagent recovery, as well as an optical sensing system, and associated software programs.

Both instrument and microfluidic cartridges are custom-designed based on clinical or manufacturing requirements.

Applications

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

- Sample preparation at the sampling point—peptide, SiRNA isolation
- Point-of-care testing and diagnostics—bacteria, viruses, biomarkers and proteins.
- Companion diagnostic
- Cell encapsulation—spheroids, cells, etc.
- Assessment of Chemical, Biological, Radiological and Nuclear (CBRN) risks

What's new?

CEA-Leti's Flowpad-Flowstretch technology opens 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's Microfluidic cartridge:

- are 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

- **Quantitative biological assays with on-chip calibration using versatile architecture and collapsible chambers.** C.Parent, F.Boizot, M.Cubizolles, N.Verplanck, J.-L.Achard, Y.Fouilleta
- **Microfluidic device integrating a 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.Adrat, 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.

New application: multiplex measurement card.

Interested in this technology?

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