TECHNOLOGY OFFER | LIFE SCIENCES & HEALTH

ELASTOCAPILLARY-BASED POINT-OF-CARE DEVICE

KEYWORDS

- Fluid Capture
- Point-of-care diagnostics
- Blood test
- Elastocapillarity

IP status
PCT application

Priority date:
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THE TECHNOLOGY IN A NUTSHELL

New fluid-capture device based on elastocapillarity for point-of-care applications.

STATE-OF-THE-ART

Passive and effective fluid capture and transport at small scale is crucial in the biomedical field, especially for the realisation of point-of-care test. Performing these tests involves several steps including biological fluid capture, aliquoting, reaction with reagents at the fluid-device interface, and reading of the results. Ideally, these tests must be fast and offer a large surface-to-volume ratio to achieve rapid and precise diagnostics with a reduced amount of fluid. Such constraints are often contradictory as a high surface-to-volume ratio implies a high hydraulic resistance and hence a decrease in the flow rate.

THE INVENTION

The invention is a fluid capture device that takes advantage of elastocapillary deformations. The hierarchical design of the device, that consists in vertical grooves stacked on an elastic sheet, enables a two-step sequential fluid capture. Each unit groove closes due to capillary forces when a wetting liquid penetrates, yielding the closure of the whole device in a tubular shape, where additional liquid is captured.

KEY ADVANTAGES OF THE TECHNOLOGY

- Rapid and passive testing method allowing direct aliquoting and incubation with high surface-to-volume ratio, requiring no operator intervention or mixing
- Direct and fast readout
- Quick absorption enables viscosity estimation and hematocrit level assessment
- Requires only a minimal quantity of liquid (typically few microliters)

POTENTIAL APPLICATIONS

- Plasma viscosity measurement
- Hematocrit level assessment for rapid anemia detection
- Tear transfer system
- ABO blood typing

CONTACT

KNOWLEDGE TRANSFER OFFICE

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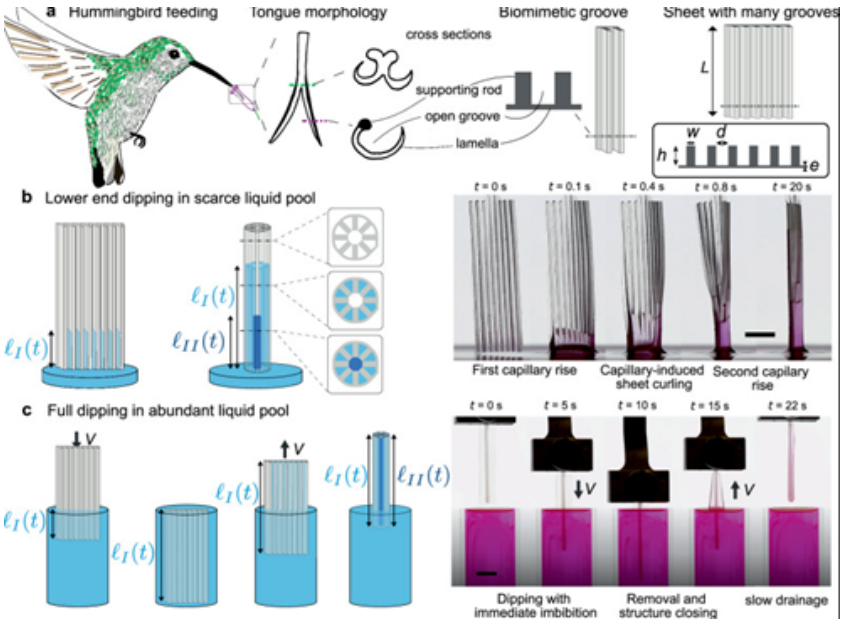
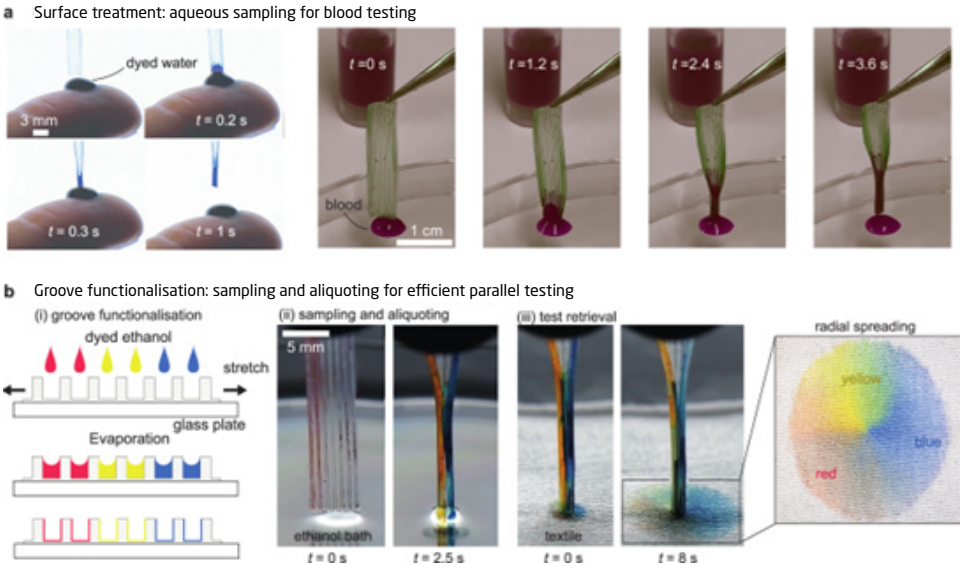


TECHNOLOGY READINESS LEVEL

1 2 **3** 4 5 6 7 8 9

TRL-3 - Proof of Concept



LABORATORY

This project is a collaboration between CHU Brugmann, the Non-linear Physical Chemistry Unit (NLPC) and the Transfers, Interfaces and Processes (TIPs) laboratory of the *Université libre de Bruxelles* (ULB). CHU Brugmann is a major public university hospital in Brussels affiliated with ULB, playing a key role in clinical research, medical training, and patient care. The TIPs laboratory focuses on experimental and theoretical microfluidics using advanced microfabrication techniques, whereas the NLPC unit is specialized in modelling self-organized processes to create desired structures spontaneously. This partnership ensures a strong link between fundamental and applied research and clinical applications.

RELEVANT PUBLICATION

> Siéfert E, Scheid B, Brau F, Cappello J. *Elastocapillary sequential fluid capture in hummingbird-inspired grooved sheets*. *Nat Commun.* 2025 May 27;16(1):4913. doi: 10.1038/s41467-025-60203-8. PMID: 40425621; PMCID: PMC12117096.

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