

# Pump-free microfluidics for protein biomarker detection

Even the most challenging samples can achieve superior resolution.

**TRL**  
3-4

The pump-free microfluidic device is a palm-size, low-cost and simple operation microfluidic chip to enhance the labelling efficiency of protein biomarkers. It is a fully portable and pump-free chip operated based on capillary attractions without any external power source or battery.

This technology decreases the clinical assay time and the variability effect from different users. When compared with a conventional sample preparation method, this system enhances the labelling efficiency of protein biomarkers relevant for stroke patient stratification from 1 hour to 15 minutes.

The pump-free microfluidic chip uses simultaneously an integrated cellulose sponge to absorb the sample and a magnetic field to align and hold the labeled targets, using magnetic nanoparticles in a pre-concentrated chamber. The dynamic interactions between the nanoparticles and the sample occur in a serpentine channel.

The crescent accumulation of magnetic nanoparticles in the pre-concentrated chamber acts as a magnetic filter and improves the biomarker-nanoparticle interaction.

This technology is now used for labelling of relevant stroke biomarkers present in human serum-based matrices. The pump-free microfluidic device, when combined with a detection system, can also be used as an integrated component of a point-of-care (PoC) platform.

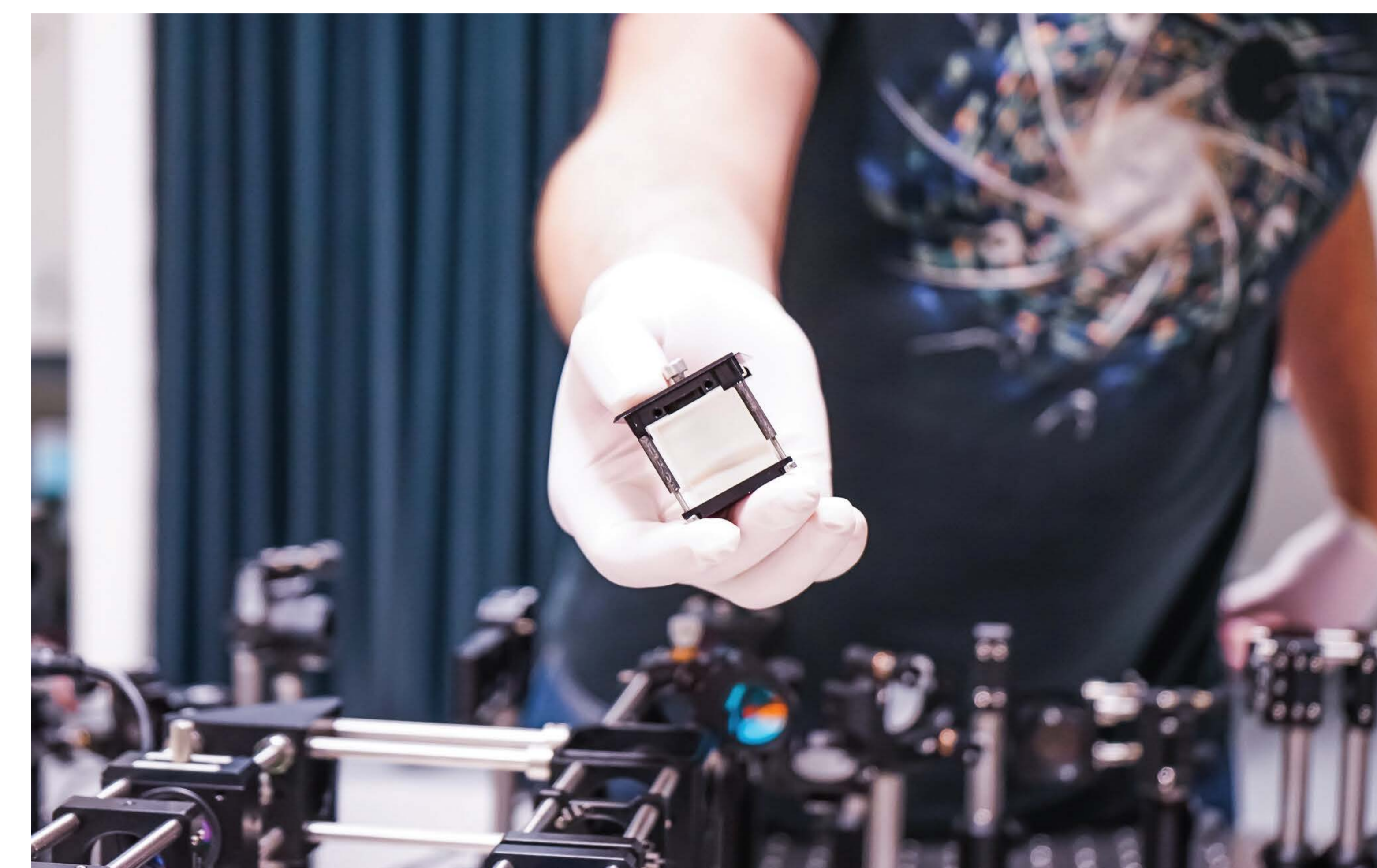
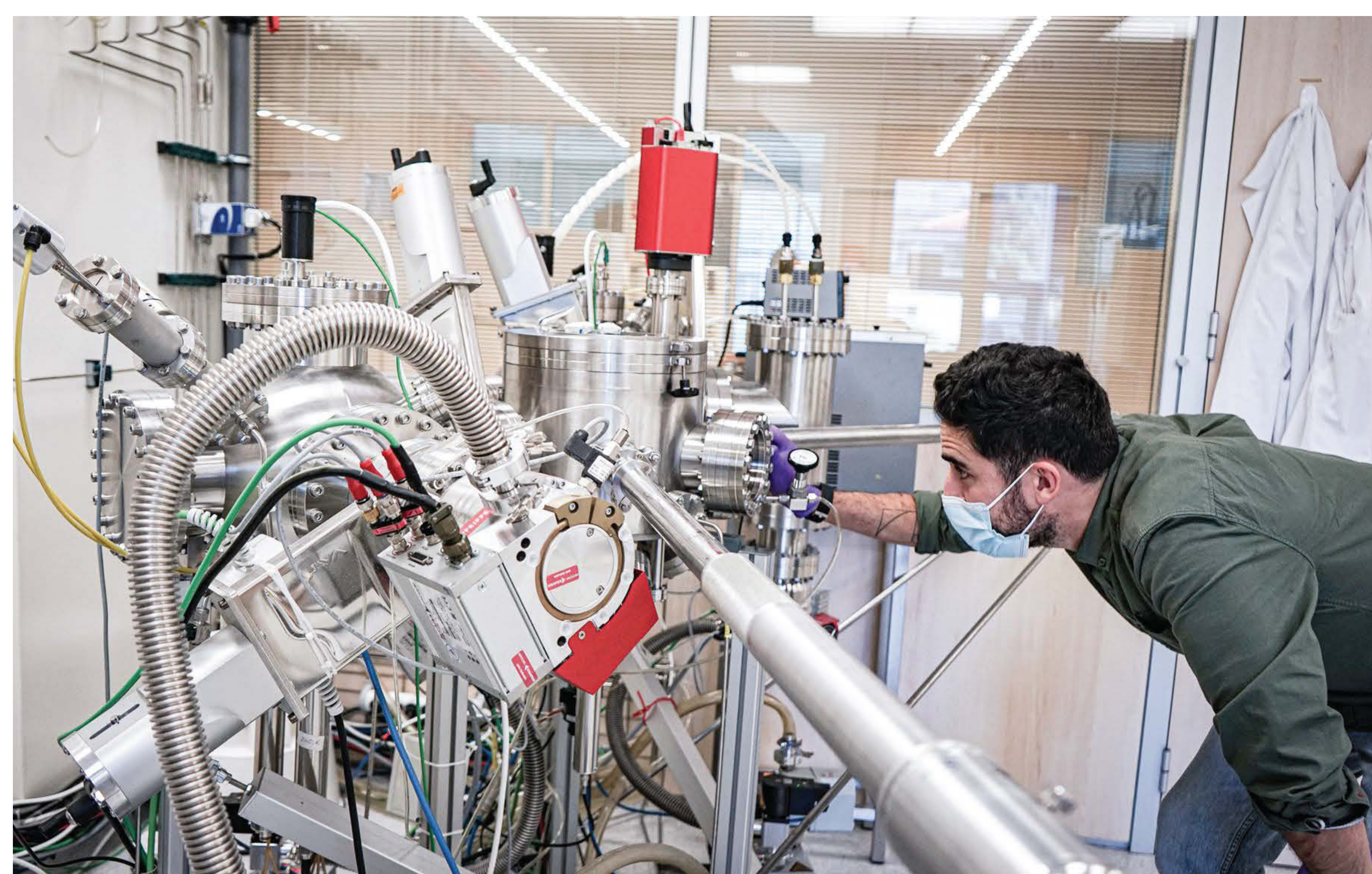


## + Suggested applications

Sample preparation  
Biomarkers labelling  
Point-of-care platform

## + Features

Portable and miniaturised (palm-size)  
Equipment- and battery-free  
Simple operation  
Disposable  
Low cost



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