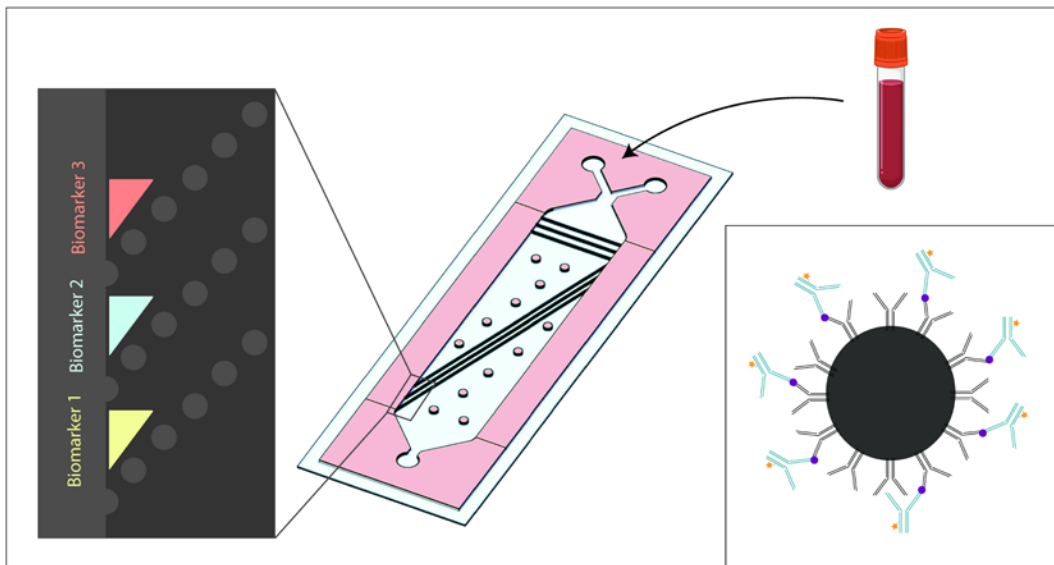


Diagnostic method for fast detection of biomarkers in Point-Of-Care settings



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Keywords

Medical diagnostics, Multi marker analysis, Point-of-care sensitive healthcare, Low volume analysis

Intellectual Property

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Description

Bead-based assays are extremely valuable in the diagnostic field, as their high surface to volume ratio ensures both fast and sensitive detection of biomarkers.

We propose a technology for electrokinetic manipulation of beads within a microfluidic channel. This approach allows to sequentially carry out the two main steps of a bead-based immunoassay, namely (i) the incubation of the analytes with the functionalized beads and (ii) the accumulation of beads in a dedicated location for signal amplification.

Our system was validated on a set of biomarkers for acute kidney injury that could be efficiently quantified in less than 15 minutes. Therefore, this invention could foster the design of compact point-of-care devices for rapid diagnosis of acute conditions or containment of viral outbreaks. More broadly, all processes implying microfluidic manipulation of beads could benefit from our innovation.

Advantages

- Our method grants enhanced incubation conditions even for small sample volumes, thanks to a novel beads manipulation technology.
- The use of electrokinetic forces as actuators outperforms the magnetic forces standardly employed for beads manipulation. The absence of magnets allows for compact packaging of the device.
- The integration of the assay within a microfluidic channel allows for fast collection of analytes while ensuring minimal intervention of an external operator as well as minute volumes of sample.

Applications

- Rapid assays (antibody- or aptamer-based) for virus or biomarker-based diagnosis
- DNA purification
- DNA Sequencing
- Particle sorting