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INTERNATIONAL IBERIAN
NANOTECHNOLOGY
LABORATORY

MAGNETO RESISTIVE BIOCHIP

A point-of-care platform able to quantify relevant biomarkers in small volume samples.

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Detecting specific biomarkers in physiological body fluids is a challenge in the development of biosensors. At INL we developed a pump-free microfluidic chip for labelling specific proteins in complex matrices that can be used as an integrated component of a point-of-care (PoC) platform. This device and its potential as a sample preparation module has been tested with a magnetoresistive biochip platform

The developed platform is a spintronic-based technology that can detect an assortment of biomarkers (nucleic acids, proteins, exosomes, microvesicles, cancer tumour cells, bacteria, or viruses) in different body fluids (serum, urine, spinal fluid) labelled with magnetic nanoparticles.

The magnetoresistive biochip is composed of an array of spin-valve (SV) sensors where specific probes are immobilised, and further detect the magnetic fringing fields introduced by the magnetic nanoparticles. This platform uses a magnetophoretic attraction/repulsion for sample concentration, to enhance the probability of biomarkers being captured by the probes immobilised on the sensor surface. The magnetic focusing system allows MNPs to be attracted toward and oscillate around the sensors, thus providing multiple capture opportunities.

The magnetoresistive biochip platform has been explored as PoC technology for the stratification of stroke patients for intravenous thrombolysis treatment, bacterial and viral infections, as well as cancer.

+ Features

Portable
Possibility to adjust sensitivity
Low sample volume (5-10 µL)
Multiplex detection (30-144 SV sensors)

+ Suggested applications

Emergency medicine (e.g. stroke patient stratification for thrombolytic treatment)
Oncology (e.g. cancer biomarkers)
Bacterial and viral infections

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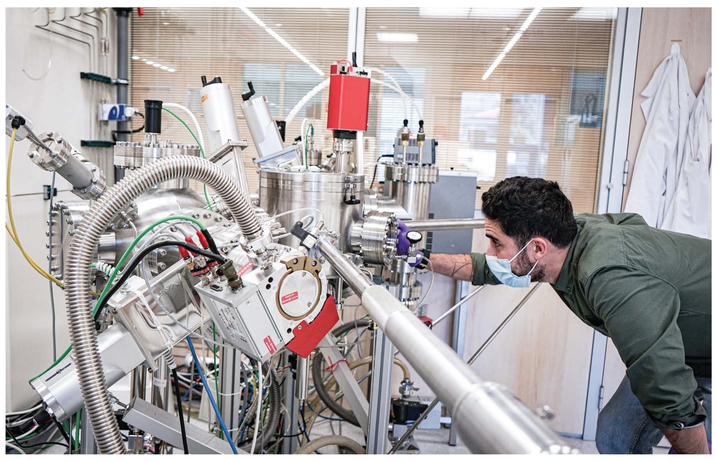

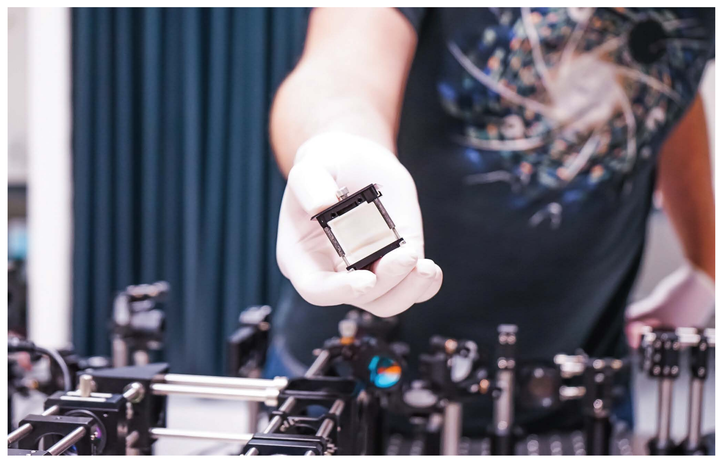

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Discover our areas of research and expertise, where we dive into nanoscience and intermix various disciplines to transform it into nanotechnology.

02 TECHNOLOGY

By nourishing on our multiple disciplines in house and with partners, we develop and deploy solutions to the market.

03 SERVICES

INL has state-of-the-art scientific equipment which can be used by internal and external stakeholders within the research, technology, and innovation fabric. You can access this open facility with expert support, either remotely or in-person, for full-service or for independent use after initial in-house training.

04 SOCIETY

INL is committed to disseminating to all audiences the nanotechnology concepts, to bring society closer to our scientific developments. Visit our website and explore our activities and events.

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