Rapid diagnostics, a new opportunity for European companies

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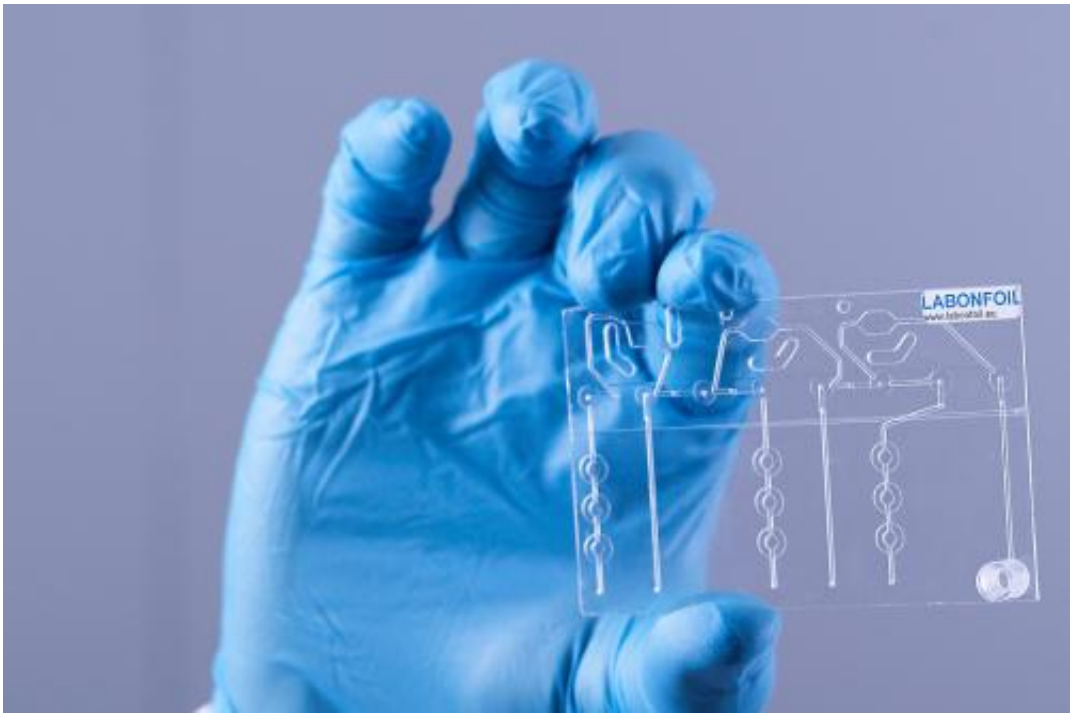

LabOnFoil

Led by the Basque R&D Alliance IK4, 13 organisations in 8 different countries have been conducting research for three years under the European LabOnFoil project to develop new rapid diagnostic devices.

A patch for detecting cocaine consumption from skin perspiration, a chip to identify pathogens in foods, a device for monitoring colon cancer

via a patient's blood, and a sensor to detect environmental contamination via the analysis of marine algae. All four applications have something in common: they all arose from the same European research project, entitled LabOnFoil. This initiative, which ended recently, was set-up to develop rapid and low-cost diagnostics devices that could be adapted to different situations and, in short, offer society new advances to improve quality of life.

The collaboration between the 13 entities from eight European countries who participated in the project has borne fruit in the form of the aforementioned four applications, which have generated new business opportunities in sectors with high added value. As underlined by the project coordinator, Jesús M. Ruano-López, "the consortium's efficient use of resources and good management in general have enabled LabOnFoil to have a significant economic impact".

No wonder some of the applications are now being commercially exploited by different consortium partners. The Spanish company POC Microsolutions, for example, is industrialising one of the prototypes for launch on the market in 2015. For its part, the Irish company Biosensia is launching patches onto the market to detect the presence of drugs, whilst DTU Nanotech (Denmark) is opening a new line of business based on one of these developments.

The LabOnFoil project, which commenced in 2008 and ended in February 2013, had a budget of 7.1 million Euro, and was co-financed by the VII European Framework Programme (EU).

Ruano-López explained that "the goal for all LabOnFoil project partners was none other than the development of devices with a positive social and economic impact. Results have been achieved thanks to our determination to develop compact, reliable devices with added value compared to existing competitors, that is, that could be commercially

exploited".

"Teamwork has enabled us to combine consortium members' different specialisations, such as microtechnology, molecular biology, materials, and electronics, to develop much more compact, economical and easier to use diagnostic systems than exist at present. Which ultimately enables drugs, illnesses, contamination, etc. to be identified in very different scenarios, with a very significant commercial impact", stated Ruano-López.

The applications

The cocaine skin detection patch can detect drugs in human perspiration, which it samples after being attached to the arm. This makes it possible to analyse cocaine consumption in real time over a period from 24 hours to ten days (until skin cells are regenerated), making it an effective tool for monitoring professional drivers and hauliers. Bear in mind that drug consumption is estimated to be related to around 25% of fatal accidents in Europe, the USA and Australia.

The chip used for identifying pathogens in foods focuses on detecting different bacteria, such as Campylobacter and Salmonella. Not for nothing, campylobacteriosis and salmonelosis are the most common bacterial infections in Europe, and are amongst the five most common infections on the continent. This application could be used to detect the pathogens at farms or livestock holdings, abattoirs and in food.

The device for monitoring colon cancer via a patient's blood can be used for monitoring patients with this illness, the second most common cause of death in the west. The device offers the option to monitor illness progression using just a few drops of blood, and provides almost instantaneous results.

The device for examining patients with colorectal cancel will carry out minimally invasive monitoring of their condition over time, thus avoiding tests involving colonoscopy. As Garbiñe Olabarria, head of the research at GAIKER-IK4, pointed out, "the development of this application means that it will be possible to analyse the evolution of the disease with just a small blood sample that is obtained at the doctor's surgery and which will provide the result in less than an hour".

Lastly, the water contamination device analyses phytoplankton concentration in a sample of sea water. An excessive concentration of such microscopic algae can signal negative consequences for the environment, as it may be toxic to humans, for example. What's more, phytoplankton levels are an indicator for global warming, as such organisms assimilate CO2 present in the atmosphere through the process of photosynthesis, responsible for the greenhouse effect.

The technology

The EU's aim in setting up the project was to promote knowledge in the field of rapid diagnostics devices, which constitute a very significant step forward compared to conventional techniques on account of the advantages inherent in their use: these are lab-on-a-chip based devices which offer laboratory level feature sets, but integrated into portable low-cost devices. Which means fluids can be analysed immediately and in situ, providing both time and cost savings, avoiding having to take samples to a laboratory and await results.

Likewise it is also worth noting another very significant advance made by this project: it has led to the creation of compact diagnostic systems that can also be remotely connected to computers, tablets and smartphones. Whereby, the data obtained by a device used to identify a pathogen at, for example a poultry farm, can be inspected by a vet located in another part of the world.

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