

# POSITIVE

**A highly integrated and sensitive POrous SIlicon based lab on a chip for multiple quantitaTIVE monitoring of Food allergies at point of care.**

**Keywords:**

Lab on a chip

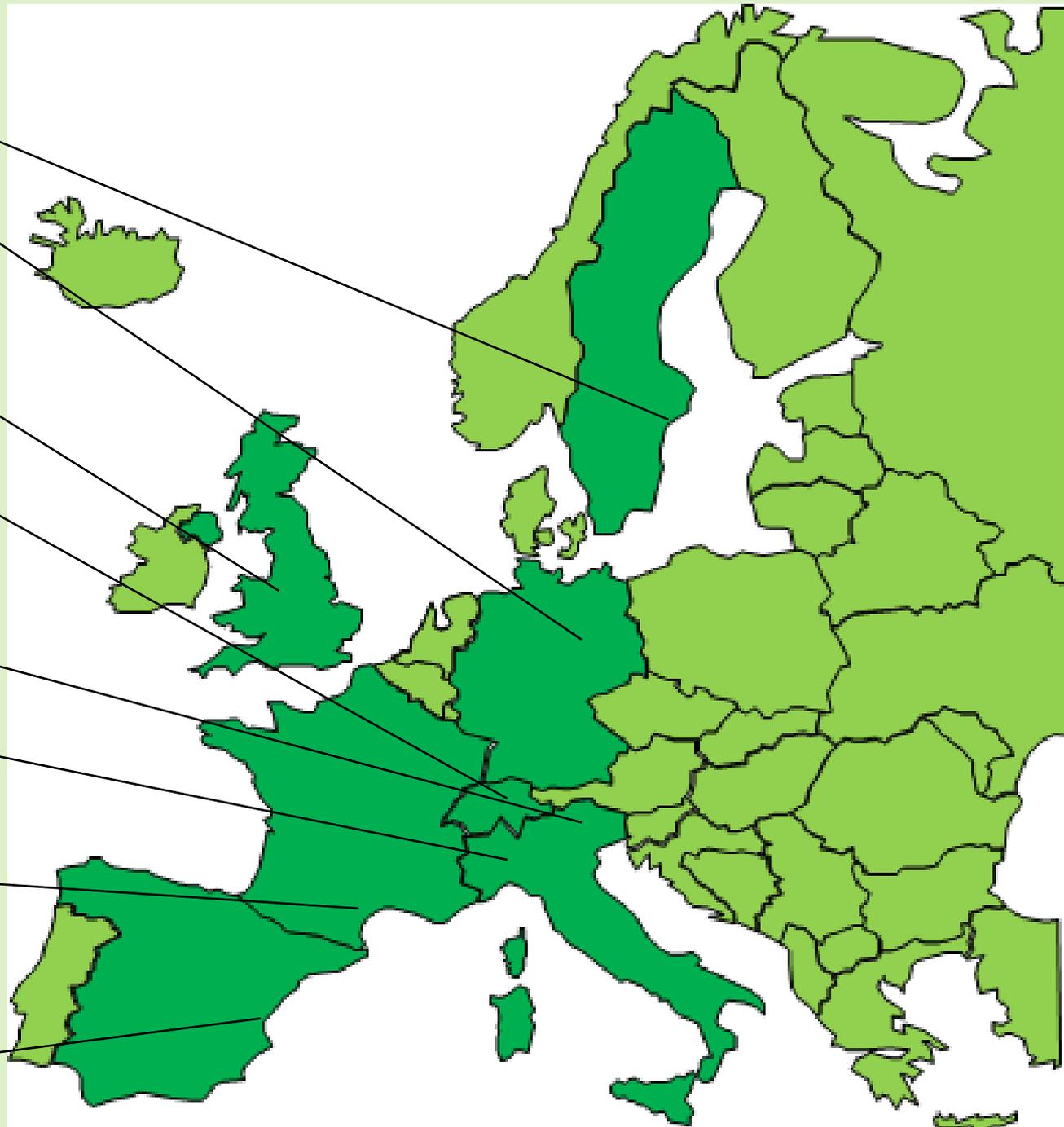
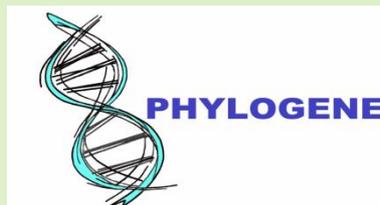
Rapid cost-effective multiplexed biochip  
integrated sample preparation

Microfluidic

Porous silicon

portable label-free multiallergy diagnostic  
biomolecular recognition optical sensor

Contact information: [www.fp7positive.eu](http://www.fp7positive.eu)



# About food allergies

Food allergies – sensitization to food products

Life threatening:

Can provoke clinical reactions whose most severe is anaphylaxis, with respiratory and/or cardiovascular problems that might result in death.

They are common in 1-2% of adults and up to 8% of children, corresponding to a serious public health problem that affects over **15 million people in Europe** from infants to the elderly and its prevalence is increasing.

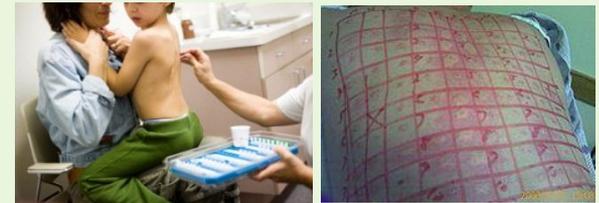


Current diagnostic technology:

Skin prick test - has its limitation.

Alternatives are blood based tests, mostly using the FEIA, RAST and ELISA techniques, usually lab-based.

Point-of-care devices exist; but only a few allergens at a time and give at best semi-quantitative determination.



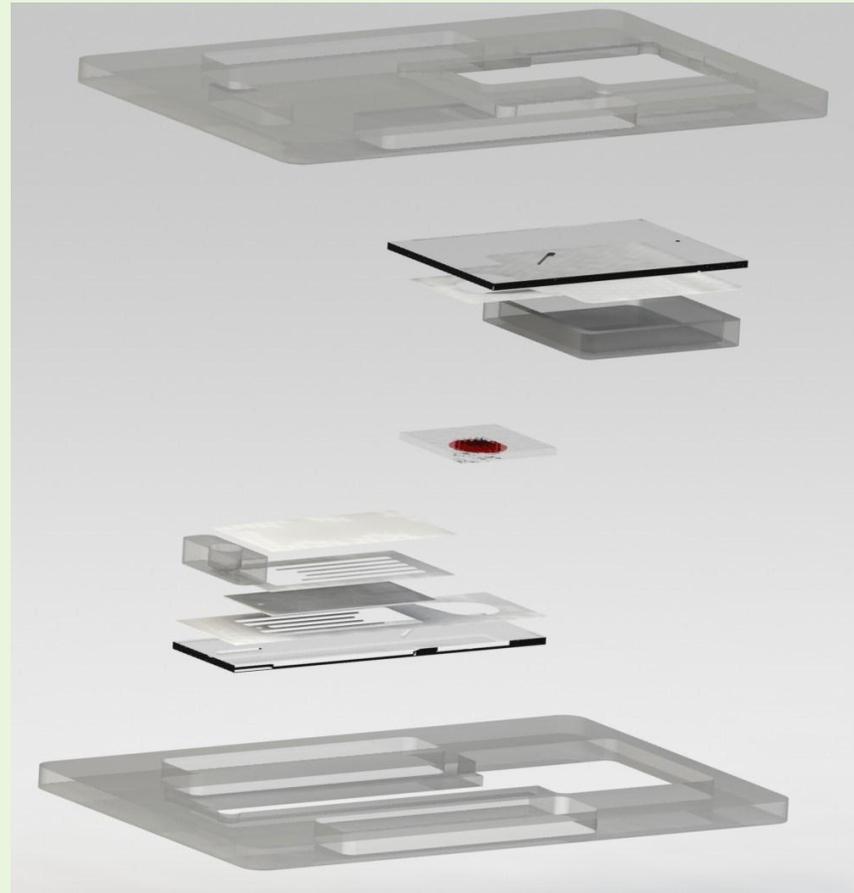
**POSITIVE technology:**

**100µL whole blood sample**

**Sensitization determination to 10 food allergies in 15'**

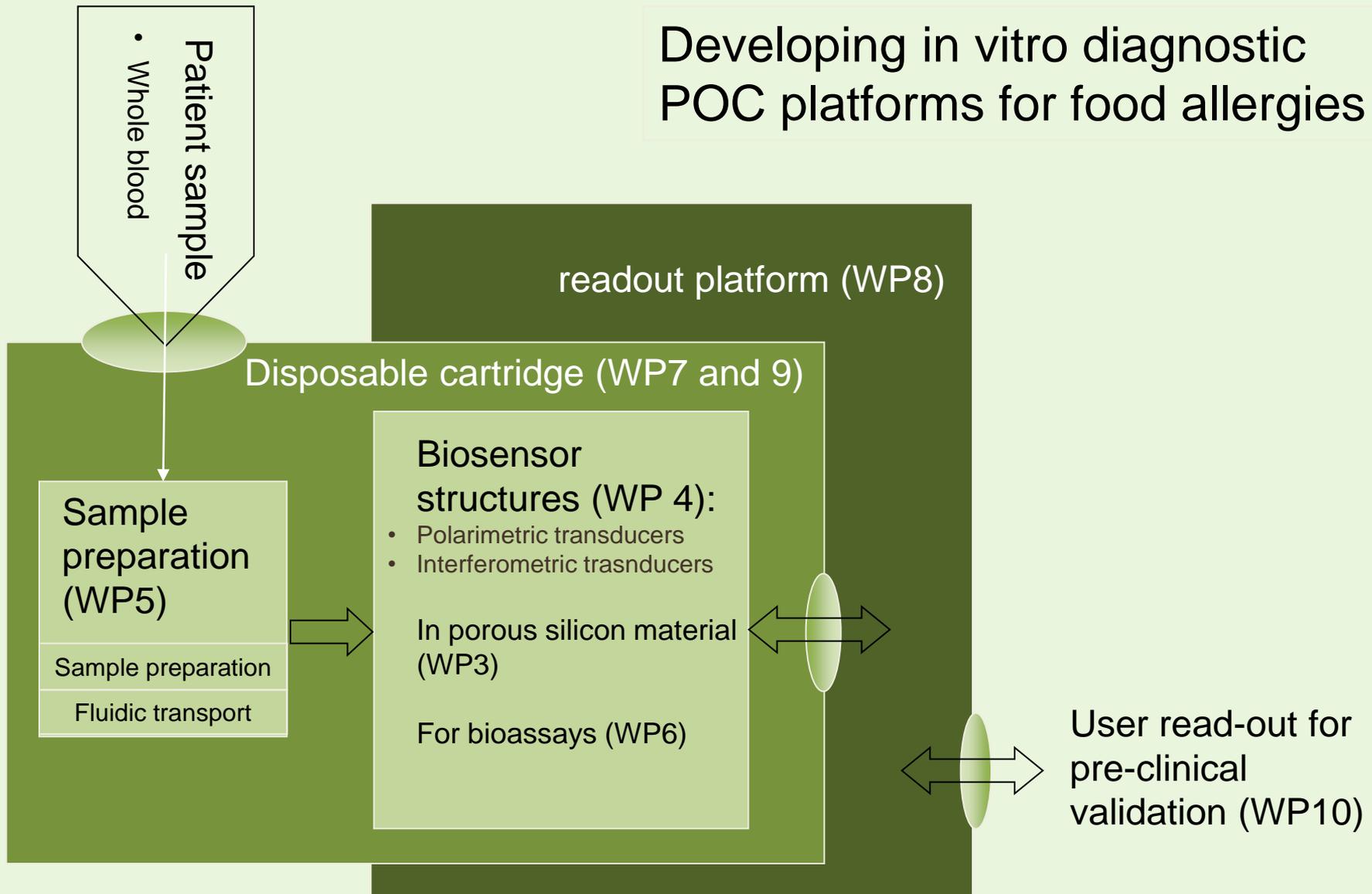
# Our Goal

- A commercial product within two years of project conclusion.
- Innovative and commercially relevant research is ensured by the consortium's two technological companies' clear vision of what the market is and what is needed of the product if it is to be successful.
- All pediatricians should have this machine on their desk, whether they work in a hospital or in general practice.
- The companies' knowledge of the market really provides us with an excellent road map for innovation, making sure that we will be able to exploit our results fully.



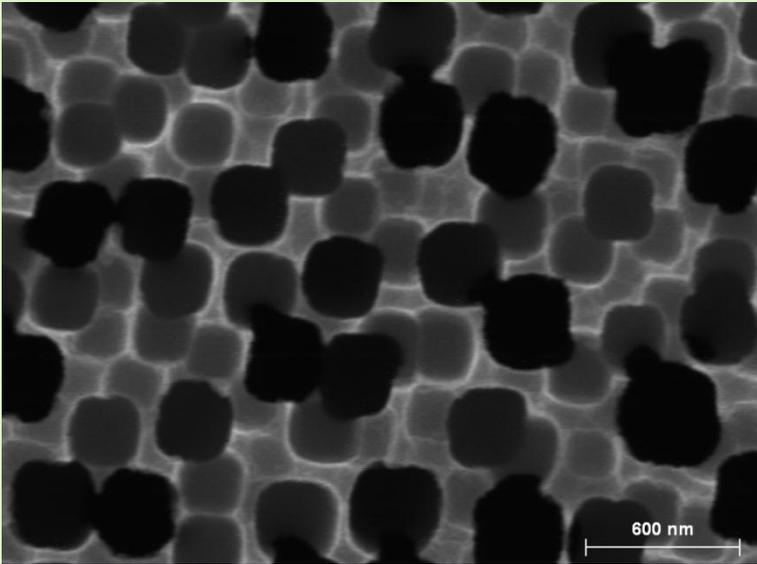
# Positive diagnostic procedure

Developing in vitro diagnostic POC platforms for food allergies



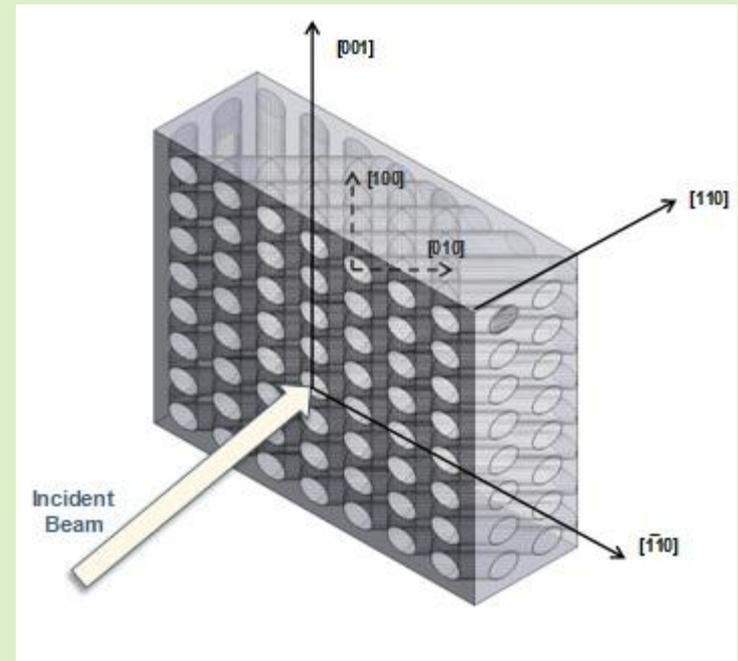


# Porous silicon transducer material and mechanisms



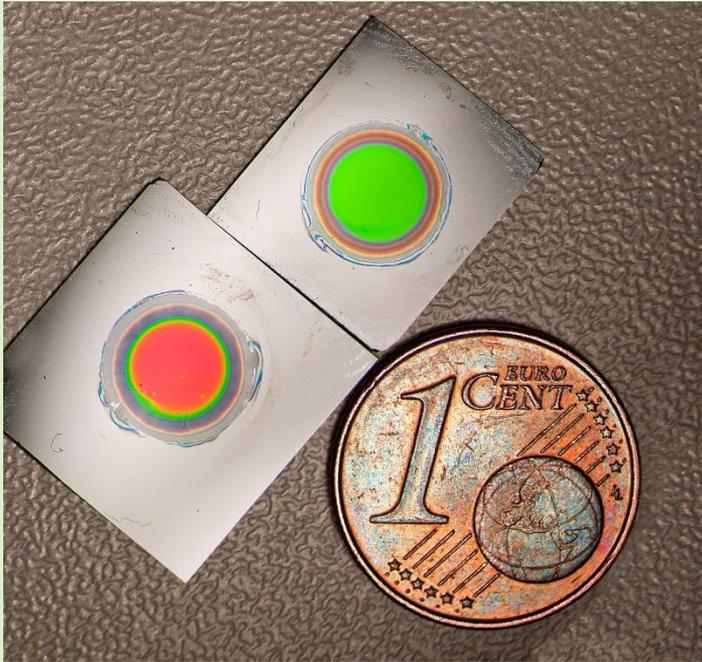
Porous silicon sample made at UNITN,  
electron microscope image  
courtesy of University of Valencia

Polarimetry schematic,  
courtesy of University of  
Valencia



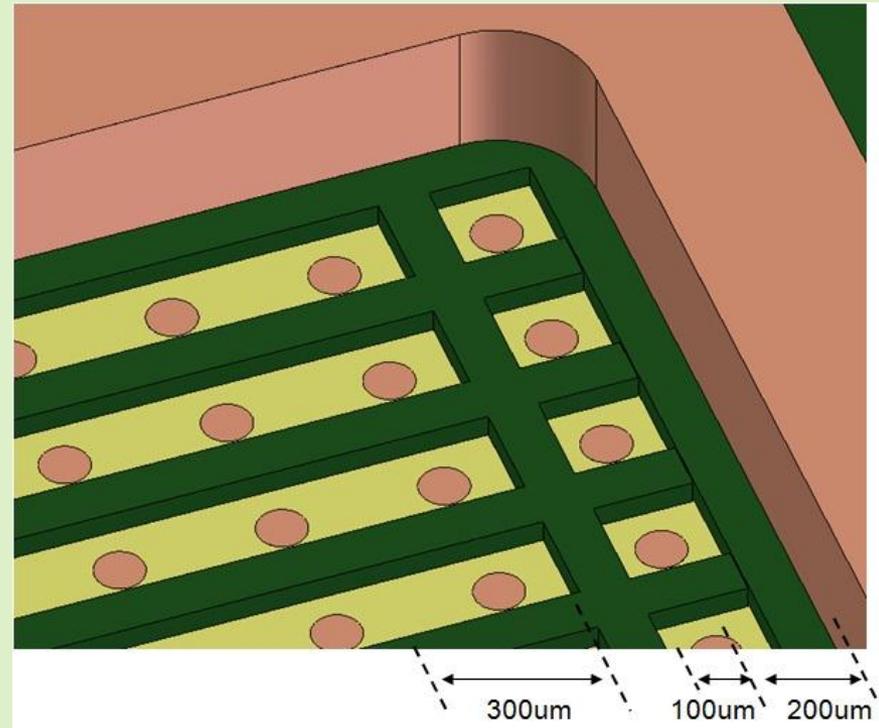
Functionalized porous silicon with surface based immunoassays  
with sensing by two different transducer mechanisms

# Porous silicon transducer arrays



Porous silicon membranes

Arrays of optical transducers defined within a membrane



# Positive Innovation

- **Entering Y3** - great advances made against very difficult challenges.
- Technologies developed offering functionality for Positive and beyond.
  - **Reliable/reproducible process to obtain porous membrane** with highly tailored structural properties (thickness, porosity and pore size) and fluidic-friendly. *Filtering applications.*
  - **OSTE materials** - the first polymeric material developed specifically for microfluidic devices. *Competition with commodity and engineering plastics in commercial devices.*
  - **Blood filter module** that enables several 100 ul of whole blood to be filtered and plasma to be generated for subsequent analysis. *Lab on Chip applications.*
  - **Multiple spot phase change measurements.** Overcomes the instability limitations found in phase change measurement systems. *Interferometry applications.*
  - Proprietary robust polymer coating for improved surface functionalization of sensors. ***The area of potential applications is very diverse and large.***
  - Disposable cartridge including a low-cost module for sequentially flowing liquids from individual reservoirs. ***Lab on Chip applications.***

# Positive Progress

- *Integrating these technologies* into a prototype machine since Y1.5 for delivery to the clinical partner, Charité Hospital Berlin.
- Charité will carry out *trials with the instrument* and pre-validate it up until the end of the project.
- Sensors will be able to get up to *ten different measurements of food allergies at a time* in our eventual prototype, which will tell us to what degree the person is allergic.
- Sensors can then be *scaled up to hundreds of food allergies* in order to be able to test all the food allergies at the same time.

[Read more about the project on Positive's homepage](#)