

# An Italian START UP offers its ultrasensitive and portable lab-on-a-chip technology and artificial intelligence algorithms for the rapid and sensitive analysis of biological fluids

## Summary

Profile type	Company's country	POD reference
<b>Technology offer</b>	<b>Italy</b>	<b>TOIT20220614020</b>
Profile status	Type of partnership	Targeted countries
<b>PUBLISHED</b>	<b>Research and development cooperation agreement</b>	<b>• World</b>
Contact Person	Term of validity	Last update
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## General Information

### Short summary

An Italian START UP, spinoff of two research institutes, offers ultrasensitive lab-on-a-chip based system to analyze biological fluids. The patented lab-on-a-chip detects proteins, antibodies, viruses, and bacteria in few minutes. The main applications are biomedicine, security, industry 4.0, and food analysis. The company is open to different typologies of cooperation agreements (License, Joint Venture, Manufacturing, Research or Technical cooperation) for device engineering and production.

### Full description

The Italian START UP, is a spinoff of two internationally renowned research institutes, focuses on nanotechnology and artificial intelligence. The company was founded in 2020 to develop an ultrasensitive and portable lab-on-a-chip technology for rapid analysis of biological fluids.

The technology underlying the device is nano-acoustics. Namely, surface acoustic waves (SAWs) at ultra-high-frequency (GHz) interact with the liquids and the molecules to be analyzed. The lab-on-a-chip can detect numerous analytes on a small surface, thanks to advanced techniques for immobilizing probing molecules and artificial intelligence data analysis. Some examples are the detection of measles virus in whole human saliva, SARS-CoV-2 spike protein, legionella bacteria, GFAP protein (traumatic brain injury biomarker), short nucleic acids (application under development). The device can find applications in several fields such as biomedicine, environmental monitoring, contaminants

detection, security, industry 4.0, and food analysis.

The device is ultrasensitive and portable. It consists of a mobile reader platform (20 X 20 cm) and a disposable cartridge where the biological fluid (~100 ul) is injected through a syringe, without the need for sample pre-processing. The platform integrates artificial intelligence algorithms for interpreting data, therefore, granting proper diagnostic, especially in case of multiple analysis giving its use with little trained personnel.

Regarding performances:

- 6+ analytes detectable in the same chip;
- analysis time ranges from a few minutes to a max of one hour.
- proteins lowest detectable concentration is ~ 10 pM - 1 nM depending on the application;
- antibodies lowest detectable concentration is ~ 10 pM - 1 nM depending on the application;
- virus lowest detectable concentration is ~ 500 units / ml
- bacteria lowest detectable concentration is ~ 5000 bacteria / chip

All performances strongly depend on the application and can be significantly enhanced if needed.

The company received investments from two different Venture Funds and is supported by several Italian hospitals. This patented lab-on-a-chip is currently under validation for the rapid diagnosis of traumatic brain injuries (TBIs) from blood. This point-of-care device will help diagnose and monitor TBI patients with fast and decentralized responses, reducing the use of unnecessary computerized axial tomographies (CATs) and magnetic resonances (MRs). Thanks to its portability, the device will be helpful in different scenarios: ambulances, war or emergency zones, populations at risk, or that need particular healthcare protocols (e.g., elders, children).

The device is highly flexible, and the company can offer ad-hoc bio-detection development upon request of the client on specific biomarkers to adapt the platform for the detection of almost every biological molecule:

- ANTIBODIES/PROTEINS
- VIRUSES
- BACTERIA
- OTHER BIO-ANALYTES

The ad-hoc bio-detection development is a service divided into three steps:

- TECHNICAL FEASIBILITY
- LAB-ENVIRONMENT TESTING
- RELEVANT-ENVIRONMENT VALIDATION

Related time of development (and consequently costs) strongly depend on the application requested. The time typically ranges from 6 to 18 months.

The patent protecting the technology holds in Europe, the USA, China, Japan, and South Korea.

The company is open for different typologies of collaborations

- MANUFACTURING AGREEMENTS for companies interested in applying or reselling the technology
- LICENSING for companies interested in developing their own applications of the technology, especially outside EU.
- JOINT VENTURES with partners interested in coinvesting for the development of the technology in particular fields of application
- RESEARCH COOPERATIONS to test further applications of their technology joining further research projects.
- TECHNICAL COOPERATION for ad-hoc bio detection development upon request

### Advantages and innovations

The patented lab-on-a-chip is a novel analysis system based on nanotechnology and artificial intelligence algorithms.

It is incredibly rapid and grants to perform complete laboratory analysis on a portable device. It grants the detection of multiple bio-analytes within the same assay. The device is entirely electrical and easy to use.

The analysis gives the response in few minutes. There is no need for specialized personnel, thanks to artificial intelligence offering a straightforward interpretation of results. Compared with similar technologies, as the electrochemical sensors, this lab-on-a-chip has greater sensitivity and is much smaller. Indeed, the lab-on-a-chip can integrate tens to hundreds of sensors on its surface in a possible embedding. Each sensor can address a different analyte as proteins, antibodies, viruses, and bacteria. The company is also evaluating the detection of nucleic acids. The product under development is compatible with large-scale production facilities. The company can easily tailor the product to specific applications upon request.

The patent protecting the technology holds in Europe, the USA, China, Japan, and South Korea.

### Stage of development

**Available for demonstration**

IPR Status

**IPR applied but not yet granted**

### Sustainable Development goals

• **Goal 3: Good Health and Well-being**

## Partner Sought

### Expected role of the partner

The company is open to evaluate different typologies of partners:

RESEARCH ORGANIZATION or UNIVERSITIES or INDUSTRIES to collaborate on device engineering and further applications development in R&D Projects through Research Cooperation

INDUSTRIES or HOSPITALS with specific needs of bio detection to develop for them custom applications of the technologies.

INDUSTRIES or HOSPITALS that wants to directly use the technologies for the applications already validated or to resell it, under manufacturing or licensing agreements.

INDUSTRIES interested in coinvesting time and money to develop particular applications of the technology through joint venture.

### Type of partnership

**Research and development cooperation agreement**

### Type and size of the partner

- **SME 11-49**
- **SME <=10**
- **SME 50 - 249**

## Dissemination

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### Technology keywords

- **05005 - Micro- and Nanotechnology**
- **06001001 - Biostatistics, Epidemiology**
- **06001013 - Medical Technology / Biomedical Engineering**
- **06001005 - Diagnostics, Diagnosis**
- **08003 - Micro- and Nanotechnology related to agrofood**

### Targeted countries

- **World**

### Market keywords

- **04017 - Micro- and Nanotechnology related to Biological sciences**

### Sector groups involved

- **Agrofood**
- **Bio Chem Tech**
- **Healthcare**

## Media

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### Images



[Biosensing Platform](#)

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[Lab-on-a-chip](#)

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