

# Minimally invasive system for faster, simpler and cheaper detection of breast cancer metastasis

## Context

Cancer metastasis is responsible for 90% of cancer related deaths. In breast cancer, metastasis occurs mostly via the lymphatic system. The lymphatic nodes that are closest to a tumour are the most likely route for the cancer cells to first enter the lymphatic system and are referred to as the sentinel lymph nodes (SLN). Diagnosing the presence of cancerous cells within the SLN is therefore critical to provide optimum treatment plans. The gold standard is currently the Sentinel Lymph Node Biopsy (SLNB).

SLNB however comes with several drawbacks:

- The procedure requires invasive surgery.
- Some patients exhibit an allergic reaction to the blue dye.
- SLNB is complicated and requires several highly skilled clinicians (surgeons, radiologists, pathologists).
- SLNB can result in false negative results (5-10%).
- The analysis of the samples also takes several days/weeks to obtain results.

## Summary of technology

HYPOSENS technology is a unique all optical cancer prognostic system that determines specifically the presence of cancer cells in the breast lymph nodes, which indicates cancer metastasis and thus a bad prognosis. This tool will be extremely useful for patient stratification and will represent a significant decrease in the diagnostic costs and an increase in the welfare of patients

## Applications

This imaging system is strategically designed to offer a minimally invasive alternative to the SLNB process. With an approximate cost of €60,000 per device unit and additional €5,500 per patient, the device is an affordable, accurate, easy to use prognostic solution for clinicians, which intends to offer a real time diagnosis of breast cancer metastasis.

Although the technology is initially designed for detecting breast cancer cells, it could be potentially adapted for other cancers in which practitioners also employ SLNB as the current prognosis test (e.g. vulval, colorectal and gastric cancer, pelvic and renal tumours), via the use of different tumour-targeting moieties.

## Benefits

**LABEL-FREE:** The photonics system uses tumour targeted nano-confined sensors for intracellular temperature and oxygen sensing.

**MINIMALLY INVASIVE:** It does not require surgery to test the lymph node status.

**FAST:** Produces results in real-time.

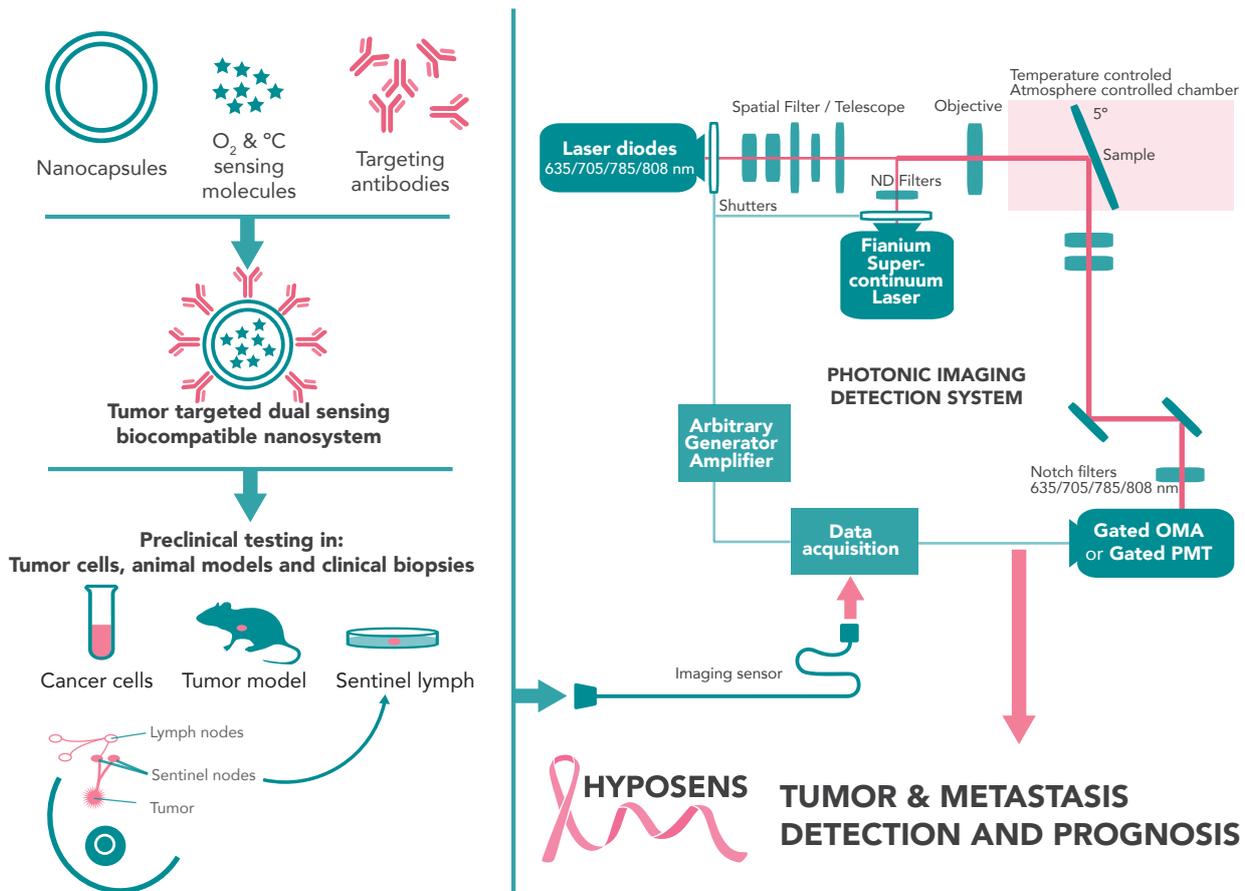
**ACCURATE:** The nano-confined sensor particles is able to monitor both temperature and dissolved oxygen. Coupling the nano-sensors with target antigens ensures the proper identification of the targeted tumour cells.

**SAFE:** The prognosis system does not release any ionising radiation.

**SIMPLE:** The device incorporates a "plug & play" architecture which render it easy to operate.

**AFFORDABLE:** Due to the compact nature of the imaging system, the development this technology results in a decrease in the diagnostic costs associated with metastatic breast cancer.

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## IP Status

This technology is, for the moment, a secret know-how.

For a more detailed information on the technology do not hesitate to contact us and, after a non-disclosure agreement signature, we would be happy to get you informed.

## Technology Readiness Level & Time to Market

The technology is currently being tested in a relevant industrial environment (TRL5) and it is available for demonstration.



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PHOTONICS PUBLIC PRIVATE PARTNERSHIP



## Keywords

MEDICAL DEVICE  
FRONT SHAPING IMAGING  
TARGETED NANOCAPSULES  
OXYGEN & TEMPERATURE SENSORS  
CANCER METASTASIS

## Business Opportunities

We are looking for any private/public funding and collaboration opportunities to further develop the HYPOSENS diagnostic imaging device to further validate the technology in vivo and clinically before it represents a market reality for improving patient's health.

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