A *multiorgan-on-a-chip* device with integrated micro-biosensors

International Iberian Nanotechnology Laboratory (INL) and the University of Minho have developed an advanced microfluidic device comprising multiplexed micro(bio)sensors acting as a standard preclinical screening platform.

Pharmaceutical industry, tissue engineering, biomedical and biotechnological companies and other stakeholders along the value chain are being sought to collaborate.

An offer for Patent Licensing

Product

Organ-on-chip (OoC) platforms represent a revolutionary technology capable of replicating complex human organ functions and realistic (patho)physiology at the microscale level. This innovation holds the potential to replace animal models in the analysis of drug efficacy, toxicity, pharmacokinetics, and pharmacodynamics and is also proposed for the **preclinical evaluation of nanomaterials** developed for medical applications, including diagnosis and therapy.

This platform provides precise information about the physiological conditions of individual organs, which is crucial for monitoring their viability and toxicological effects, especially during drug tests and when using nanomaterials developed for medical purposes.

Main Innovations and Advantages

- *In-situ* implementing **multi(bio)sensors** in contact with representative human organ models, allowing the **individual monitoring** of each organ model, separately, and in real-time.
- A platform integrating microfluidic chambers and channels, temperature sensors, pH sensors and micro-heaters for physiological or mild-hyperthermia temperature screening tests.
- The **main advantages**, when compared with conventional organ-on-a-chip platforms, are:
  1. Transparent platform using biocompatible polymeric materials for optical microscopy access;
  2. *In situ* integration of micro(bio)sensors in close contact with organ models for their precise, continuous and real-time monitoring;
  3. Reduced risk of contamination or biased results during preclinical trials;
  4. Multiorgan models assembled in the same biochip for systemic drug studies and biomedical applications;
  5. pH microneedle-sensing multiarray system for intracellular monitoring;
  6. *In situ* heating actuation system for replicating the cellular temperature environment.

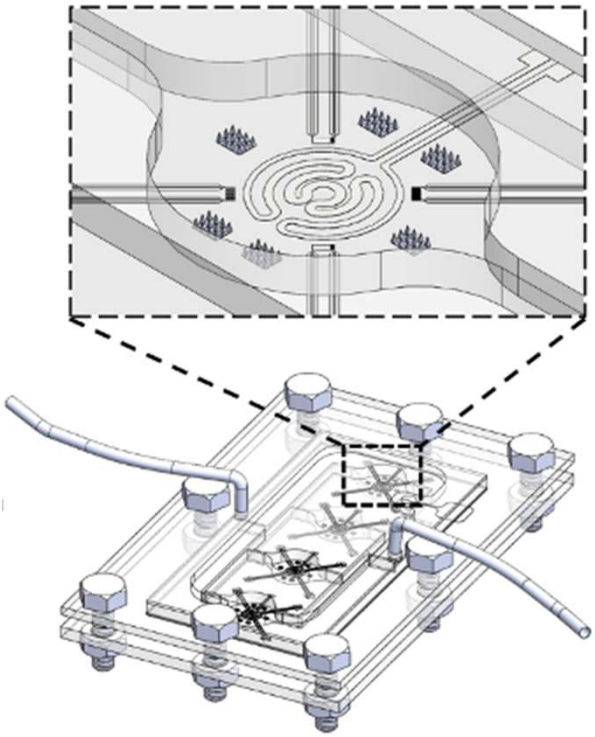

Figure: *Microfluidic device with integrated micro-sensors*