

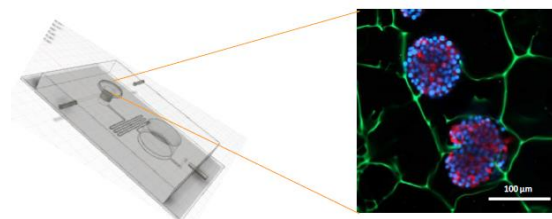


BLOC: REAL-TIME ANALYSIS OF ORGAN-ON-A-CHIP MODELS WITH NUCLEAR MAGNETIC RESSONANCE



CHALLENGE

Benchtop Nuclear Magnetic Resonance (NMR) spectrometers face limitations in analyzing full-size in-vitro tissue models due to their lower magnetic field strength and resolution. As a result, detailed analysis normally requires large, full-size NMR systems, which are expensive and require specialized infrastructure. This limits the access to NMR technologies in in-vitro drug testing and CRO environments, restricting the broader adoption in early-stage drug development and toxicology studies. There is a clear need for solutions that enable high-sensitivity and real-time metabolic analysis in physiologically relevant models using accessible benchtop platforms.



MARKET

The **NMR spectroscopy market is valued at \$1.2 billion in 2025** and is projected to grow around \$1.6 billion by 2030 (CAGR ~5.2%). The growth is primarily driven by its wide application in areas like drug discovery, metabolomics, structural biology, food quality testing, and material science. In parallel, **the organ-on-a-chip (OOC) market is experiencing rapid growth**, projected to reach almost \$1 billion by 2030 (CAGR ~30-35%) driven by the growing demand for **human-relevant preclinical models**, the reduction of animal testing, and advances in microfluidics and precision medicine.

These trends **highlight a growing need for advanced analytical platforms and human-relevant models** to enable more **predictive and translatable** biomedical research and drug development.



ASSET

An enabling technology for **real-time monitoring of tissue metabolism in OOC platforms** using a **benchtop NMR** spectrometer with a specific configuration. We offer an integrated chip that combines microfluidics for analyte delivery, specific RF antennas, and an embedded OOC platform, together with a methodology for NMR measurements. The system enables both **acquisition of conventional NMR** and **enhanced sensitivity via Dynamic Nuclear Polarisation (DNP)**, allowing the detection of low-concentration metabolites in physiologically relevant conditions.

Licensing our technology enables **the expansion of benchtop NMR capabilities** to include **OOC-based metabolomic analysis**.

Team

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Stage of Development

- Protected prototype for enabling hyperpolarized NMR measurements in OOC.
- Proof of concept analyzing OOC model for metabolic-associated fatty liver disease (MAFLD) using our enabling technology and DNP acquisition.

Exploitation Plan

- **Patent available for licensing** with technical collaboration
- **Open for co-development.**

Intellectual Property Status

Currently in **national phases**: US & EU

ASSET VALUE

- Enables analyte testing in complete tissue models using benchtop NMR spectrometer.
- Provides in situ, real-time and non-invasive monitoring of metabolism in OOC systems.
- The chip is designed with microfluidic channels for rapid delivery of analytes, substrates and drugs.
- RF coils are embedded and tailor-built for OOC systems.

USES

- **Drug screening** and real-time monitoring of **metabolic** and **inflammatory** responses.
- In-vitro **metabolomic** applications in **MAFLD** OOC models.
- Advanced **metabolic pathway analysis**.