



DRUG TESTING PLATFORM



CHALLENGE

Current drug development relies heavily on animal models and conventional 2D cell cultures, which often fail to accurately predict human responses. At the same time, there is a **growing need** for **analytical platforms** capable of providing **profound insights** into **metabolic processes, disease progression and treatment response**.



TECHNOLOGY

A platform which combines three integrated elements:

1. Organ-on-a-Chip (OoC)

- 3D cell matrix based on a specialized biomaterial scaffold
- Multi-well microfluidic device
- Continuous media perfusion
- Controlled temperature and CO₂ environment
- Simultaneous testing of multiple samples and conditions

2. Modalities of Magnetic Resonance Spectroscopy (MRS):

• Non-hyperpolarized MRS

- ¹H-NMR metabolomics
- X-nuclei NMR (¹³C, ¹⁵N, ¹⁷O)
- Endogenous metabolites or labelled tracers

• Hyperpolarized Nuclear Magnetic Resonance (HP-NMR)

- Dynamic Nuclear Polarization (DNP)
- Sensitivity enhancement of up to 10,000-fold
- **Real-time monitoring** of metabolic pathways and reaction kinetics

3. Advanced analytical tools

- Data processing optimization
- Data reporting
- Predictive capabilities for drug development and clinical applications

OUR SOLUTION

An integrated metabolic analysis platform based on Organ-on-a-Chip technology, MRS, and advanced analytical tools for drug development, screening and clinical research applications.

Team

Irene Marco Ruis - Scientific Leader
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Exploitation Plan

Drug testing and **metabolomic analysis services**
Licensing opportunities

Intellectual Property Status

Two patent families protecting conventional and hyperpolarized MRS-based Organ-on-a-Chip metabolomic analysis.

Interested parties

- Pharmaceutical industry, CROs, Biotech
- Hospitals & clinics
- Research centres
- Precision medicine and
- translational research programs

Contact

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ASSET VALUE

- Human-relevant in vitro testing platform
- Non-invasive monitoring of cellular metabolism
- Reduced reliance on animal models
- Improved decision-making for drug development and disease research
- Support for personalized medicine approaches

APPLICATIONS

- Toxicology
- Efficacy assessment
- Mechanism of action
- Target validation
- Lead optimization
- Candidate selection
- Oncology
- Metabolic diseases