



ELYSO: Soft bioreactor for post-loading elastomeric encapsulation



CHALLENGE

Current organ-on-chip platforms, microphysiological systems, and tissue engineering bioreactors **rely on rigid or semi-rigid device architectures fabricated from materials such as glass, polystyrene, or structured PDMS**. These systems are typically assembled using irreversible bonding, adhesive layers, or mechanical fixation strategies that require device sealing prior to biological loading.

Existing enclosure and sealing approaches have become a critical limitation as the field shifts toward softer, mechanically compliant culture systems that better replicate native tissue environments. Current solutions do not support wet loading, post-loading encapsulation of biological constructs, or fully deformable device architectures, restricting the development of mechanically active in vitro models for tissue maturation, mechanobiology, and organ-on-chip applications.



MARKET

ELYSO addresses the rapidly growing **organ-on-chip (OoC)** and **microphysiological systems (MPS)** markets, driven by demand for predictive, human-relevant preclinical models and alternatives to animal testing.

The global **OoC market** is projected to reach almost **\$ 1 billion by 2030** (from \$ 157 million in 2024; CAGR >35%), while the **MPS market** is expected to reach approximately **\$ 721 million by 2030** (CAGR > 30%).

ELYSO enables the **next generation of soft, mechanically compliant bioreactors** and **organ-on-chip platforms** for these emerging applications.



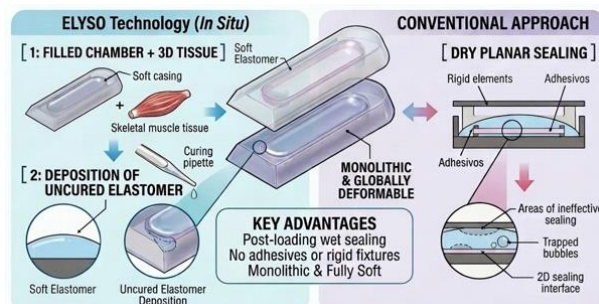
ASSET

ELYSO offers significant advantages in biological compatibility and device integration. Because sealing is achieved without adhesives, mechanical compression, or elevated temperatures, sensitive cells, organoids, hydrogels, and tissue constructs **can be encapsulated under wet and sterile conditions with minimal handling**.

The **monolithic elastomeric enclosure** maintains **fluidic integrity during bending, stretching, and compression, reducing the risk of leakage and seal failure** associated with multi-component assemblies. By eliminating rigid holders, fasteners, and planar bonding requirements, ELYSO enables mechanically compliant bioreactors with unprecedented design freedom for mechanobiology, dynamic tissue maturation, organ-on-chip, and biohybrid systems.

ASSET VALUE

- Enables post-loading encapsulation of biological constructs
- Eliminates adhesives, clamps, and rigid closures
- Supports mechanically compliant tissue models
- Improves compatibility with dynamic and deformable culture systems
- Facilitates the development of next-generation soft bioreactors and organ-on-chip platforms



Team

Elena Martínez Fraiz - Scientific Leader
Patricia Zoio - Researcher
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Stage of Development

TRL 4 - Laboratory-validated prototype
Application-specific validation ongoing

Regulatory Path (if needed)

Research Use Only (RUO). Regulatory pathway dependent on end-use application.

Intellectual Property Status

Priority application filed in March 2026

Exploitation Plan

Product available for co-development and licensing

Potentially interested parties:

- Pharma • Biotech • CROs • OoC developers • Bioprinting companies
- Research organizations

USES

- Organs-on-a-chip platform (OoC)
- Microphysiological systems (MPS)
- Tissue engineering
- Organoid and 3D cell culture
- Bioprinting & Biofabrication
- Drug discovery & preclinical testing
- Biomedical devices (implantable & wearable)
- Soft microfluidics and biosensing
- Biohybrid and soft robotics