A disruptive technology enabled by the Open FET project
EU FP7 ICT-FET-29625 „Body on a Chip“

Olivier Frey, Dr. Sc.
Head of Technology & Platforms
InSphero AG
InSphero | In Numbers

2 Sites (CH & US)

>20'000 Tissues per month

>80 Industrial clients

>20 Industrial partnerships

>10 Public funded projects

50 Employees

>20 Different tissue types

>120 Customer projects

>20 Academic partnerships

10 Patent families
3D InSight™ Human Liver Microtissue | Integrated biology

- Intact metabolism
- Mitochondrial activity
- Bile acid secretion
- Inflammatory response
3D InSight™ Human Liver Microtissue | Physiological relevance

Help Pharmaceutical, Biotechnological and Cosmetic Industry developing new drugs

• more efficient
• more safe
• using less animals
3D InSight™ Human Liver Microtissue | Matching technology

Platforms engineered to fully capitalize of the enhanced biology

- Unique plate formats and features
- Adapted assays
**3D InSight™ Human Liver Microtissue | Shipping technology**

- Available assay-ready
- On-demand
3D InSight™ Microtissues
A technology for a large set of different organ models
Evolution of InSphero
Next technological innovation steps enabled by FET

- Next generation analytical assay platform
- Combine different microtissue types
- Human-based
- Providing unparalleled systemic insight during the pre-clinical in-vitro stage of DD
Body on a Chip concept
Emulating systemic interaction of compounds on the human body
Body on a Chip concept
Emulating systemic interaction of compounds on the human body
Body on a Chip concept
Off-chip production and on-chip integration

- Reliable and standardized off-chip 3D InSight™ microtissue production
- Available on-demand and QC’ed

- Microfluidic channel network with custom-designed 3D microtissue compartments
- Individual loading and removal

- In vivo-like functions
  - Organo-typic function
  - Long-lived

- In vivo-like conditions
  - Cell-to-liquid ratios
  - Liquid turnover
  - Dynamic mechanical forces
Technical Innovation phase

- Initial concept tests
- Functional prototype
- Final project prototype

BOC OpenFET
Design of the PDMS chip

Basic principle
Liver-tumor interaction
Prodrug activation

- Cyclophosphamide (CP) pro-drug bioactivation
Global Recognition for the EU Body-on-a-Chip Project

- InSphero Scientist Receives 3Rs Award for Microtissue-based Body on a Chip System [Press Release]
- InSphero Publication Honored for Potential to Reduce Use of Research Animals [Press Release]
- The EU Body on a Chip Project honored by the Seventh European Union Framework Programme (FP7) in the Achievements of FP7 – examples that make us proud booklet. Read more …
- European Commission article summarizing BoC Project
- European Commission Blog Post by InSphero CTO Jens M. Kelm
Design of the polystyrene chip

Basic principle
Microfluidic concept
Simplest perfusion system using bi-directional flow

→ Miniaturized
→ Parallelized
Pre-clinical multi-tissue applications

Highly flexible arrangement of organ models
Pre-clinical multi-tissue applications
Highly flexible arrangement of organ models

DMPK    Oncology    Metabolic diseases    Metabolic competence

www.insphero.com | Olivier Frey | FETFX | March 7 | Brussels
On-demand assembly of multi-tissue configuration
Parallelized loading of microtissues

Liver microtissues plates
Tumor microtissues plate
Liver-tumor MPS

Pick-up
Contact Transfer
Future of InSphero