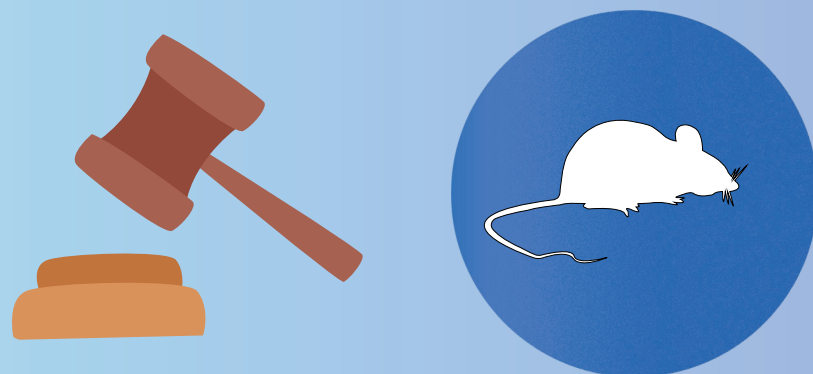
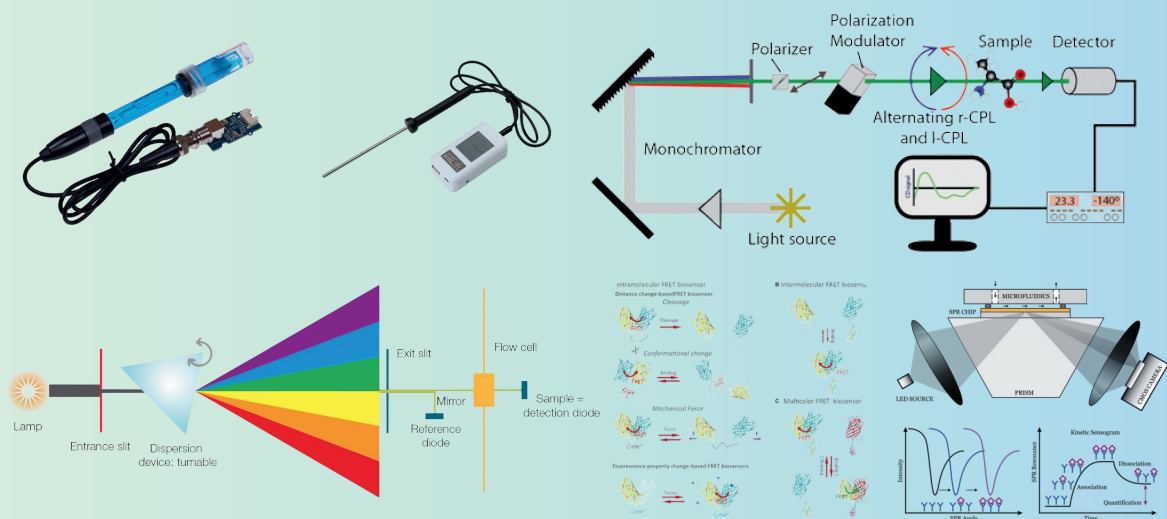


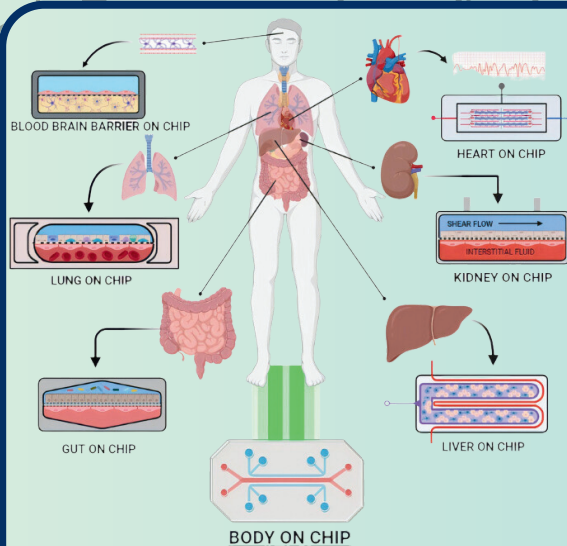
Organs on Chip – Pioneering Science Amidst Regulatory Crossroads

Ugo PASCO, M2 chemistry for care, protect and feed

In the medicinal chemistry field, photonic and electronic sensors are everywhere [1]: Surface Plasmon Resonance (SPR), Fluorescence Resonance Energy Transfer (FRET), Circular Dichroism (CD), Liquid Chromatography (LC)...



Until January 2023 [2], drugs had to undergo animal testing before entering the market, sometimes leading to catastrophic clinical trial failures, due to a model too distant from the human system (Torcetrapib, 2006; Taranabant, 2007; Tredaptive, 2012...).



The first organ-on-chip was developed in 2010 by Dongeun et al., revolutionizing in vitro assessments [3]

Lab mice



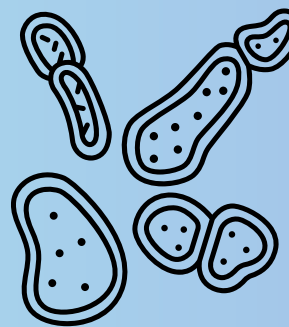
- Animal model ✗
- Ethical problems ✗

Humans



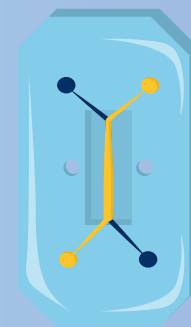
- Human model ✓
- Ethical problems ✗
- Can cause complications or death ✗

Organoids



- Close to human model ✓
- No interactions with other organs ✗
- Expensive ✗

Organs-on-chip



- Closer to human model ✓
- Interactions with other organs ✓
- More expensive ✗



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[1] Spichiger-Keller, U. E. Chemical Sensors and Biosensors for Medical and Biological Applications. (John Wiley & Sons, 2008).

[2] FDA no longer needs to require animal tests before human drug trials | Science | AAAS. <https://www.science.org/content/article/fda-no-longer-needs-require-animal-tests-human-drug-trials>.

[3] Driver, R. & Mishra, S. Organ-On-A-Chip Technology: An In-depth Review of Recent Advancements and Future of Whole Body-on-chip. BioChip J.17, 1–23 (2023).