## Session 2- RS to 2025: Catalysing the integration of science and technology in drug development

Embedding 3Rs - Ultimate aim – Replacement of animals (under Directive 2010/63 EU) Netherlands- replacement of animals in chemical safety testing by 2025

## Recent examples – integration/innovation

- 1. High Throughput cell-based assays to prioritize and characterize chemicals and drugs
  - 1. NCATS: https://ncats.nih.gov/ncgc
  - 2. In vitro to in vivo computer extrapolation modeling
- 2. Organs-on-a-chip: *Engineering, biology and regulatory requirements* 
  - a) FDA-DARPA-NIH MPS programme (2011)
  - b) Human-on-a-chip to patient-on-a-chip
    - i. E.g. Human liver used for food safety testing via CFSAN and Emulate Inc
  - c) Animal chips for animal testing
    - i. Canine gut model for drug absorption
- 3. Reduction and replacement methods for veterinary vaccine characterization
  - ELISA for batch potency testing of Leptospirosis



Harvard University
Wyss Institutes' living, breathing
lung-on-a-chip, made using human
lung and blood vessel cells, acts much
like a lung in a human body.

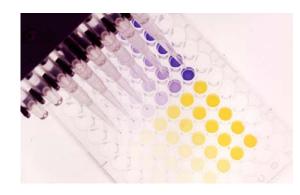
Cross section of lung-on-a-chip

LUNG CELLS

AIR CHANNEL

AIR CHANNEL

AIR pumped through side channels
makes the chip expand and contract,
replicating the action of breathing.



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**Image from NCATS** 

Image from Wyss Institute

Image from ECVAM