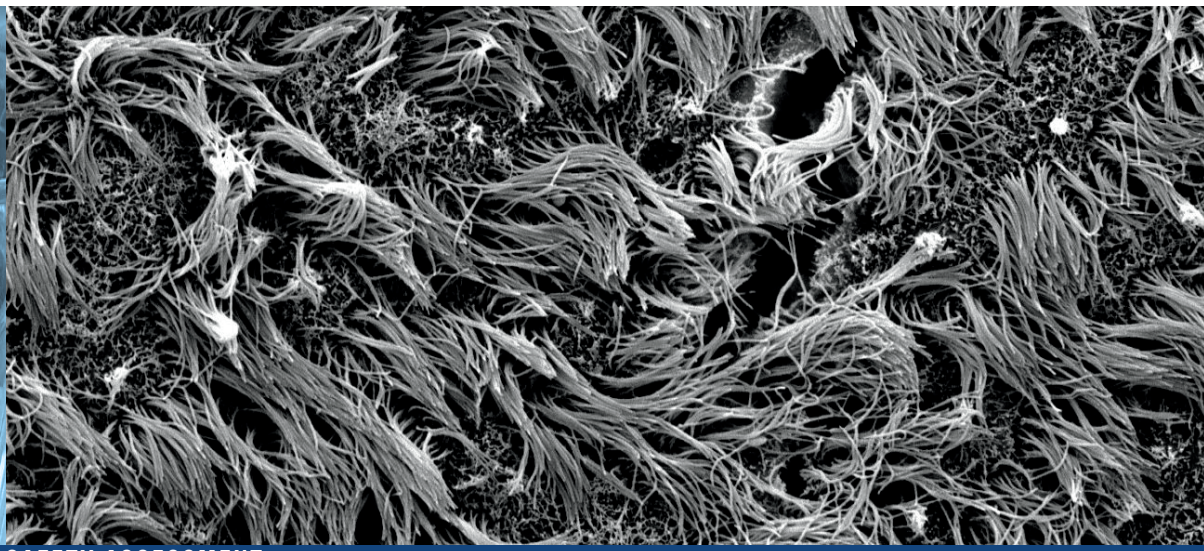
charles river



SAFETY ASSESSMENT

In Vitro Inhalation

Applications

- *In vivo* dose range finding
- Drug delivery through the lung
- Operator exposure safety testing
- Consumer exposure
- Translational toxicology
- Pharmaceutical efficacy

As part of our drive to reduce, refine and replace animal testing, Charles River has pioneered the development of *in vitro* alternatives to *in vivo* models for the assessment of novel compounds. Our Edinburgh facility proudly offers a range of *in vitro* inhalation testing services.

Product Sectors

In vitro inhalation testing is applicable in a wide range of testing scenarios across many product sectors, including pharmaceuticals, consumer and cosmetic products, and industrial and agrochemicals. Inhalation toxicology is a key predictive technology that allows us to assess rat, human and human diseased models with direct translation from preclinical to phase I clinical with toxicity and efficacy outputs.

Tissue Models

In addition to our ability to develop bespoke models upon request, we currently we work with two tissue suppliers of 3D lung tissues: Epithelix and MatTek. MucilAir™ (human upper airway/nasal epithelia) and SmallAir™ (human small airway epithelia) are available for healthy, non-smoker, smoker, and diseased pathologies. OncoCilAir™ is a novel *in vitro* 3D human lung cancer model. We are currently working with MatTek to develop and test a novel rat EpiAirway™ to complement the existing EpiAirway™ model of human healthy or diseased tissue.

Exposure Scenarios

We work with clients to determine the most appropriate exposure scenario for an individual product. We can apply materials directly to the tissues as a liquid in solution or suspension. Where appropriate, we can also test materials as an aerosol or vapor using our VC10 inhalation robot, which is compatible with our 3D cell models.

Endpoints and Biomarkers

There are many endpoints for our 3D inhalation *in vitro* services; these are available for numerous tissue types. In addition, our team has the ability to develop custom endpoints and biomarkers as needed for bespoke assays.

Sample Endpoints

- Cell viability
- Cell membrane and tight junction integrity
- Histology and pathology
- Scanning electron microscopy
- Fluorescence microscopy
- Cytokine release/ELISA
- Multiplex platforms (Luminex®, flow cytometry, etc.)
- Cilia beating frequency – planned
- Mucociliary clearance – planned

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