

TERMS OF REFERENCE



Pilot I Microfluidic Lung-on-Chip

Introduction

This pilot study is designed to test and validate a lung-on-chip (LoC) model that replicates the lung environment and simulates flow for physiological relevance. This project will assess Parkinson's disease (PD) drug candidates, particularly those validated in patient-specific midbrain organoids. By partnering with relevant companies and SMEs, the project aims to streamline the development of a commercialization pathway, making the lung and organ-on-chip systems more accessible for widespread adoption in disease modelling and drug testing, thus reducing the reliance on animal testing during pre-clinical trials.

Purpose and scope

The overarching goal is to demonstrate the LoC system's potential not only as a predictive platform for drug screening (e.g., in PD) but also as an adaptable model that reflects individual patient variability. By partnering with SMEs and in alignment with the STEP4NAMs project, this pilot aims to support the development and early adoption of pre-commercial microfluidic and perfusion technologies tailored to lung-on-chip applications, ultimately promoting innovation in non-animal testing approaches.

Approach and methodology

This pilot project is designed to test and validate a LoC model that uses microfluidic chips and perfusion platforms to replicate the lung environment and simulate physiological blood flow through engineered vasculature. By integrating serum from patients at different stages of Acute Lung Injury (ALI), the model will mimic disease progression, enabling detailed analysis of the lung's endothelial and epithelial barrier integrity, as well as shear stress responses in both healthy and diseased states. Historical data from ICUs will be used to refine the model further and assess its predictive accuracy against established clinical outcomes for ALI. In collaboration with the University of Luxembourg, the project will also assess PD drug candidates, particularly those validated in patient-specific midbrain organoids.

Pre-requisite for participation

Target partners include companies and SMEs currently developing microfluidic chips and/or perfusion systems adaptable in the context of this pilot study and are interested in having such technologies tested and validated for their performance prior to their market release.