PATENT STATUS

EP priority application, filed on 02 October 2025 with the European Patent Office. A PCT application is planned.

Reference Nr. **TM 1232**

COOPERATION OPPORTUNITIES

It is a development of Justus Liebig University Giessen, Germany originating from the German Center for Lung Research (DZL) and Institute for Lung Health (ILH). On their behalf, TransMIT GmbH is seeking cooperation and development partners or licensees for product development and for distribution in Germany, Europe, the USA, and Asia.

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JUSTUS-LIEBIG-UNIVERSITÄT GIESSEN

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SHWAS

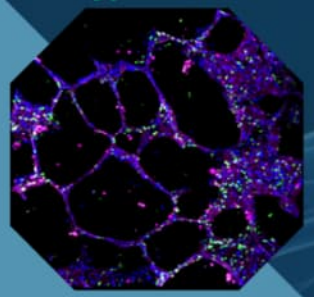
AN AIR-BASED STRETCH AND VENTILATION PLATFORM FOR PRECISION CUT LUNG SLICES

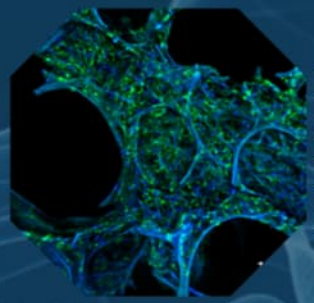
Tissue Chamber | PCLS | Lung | Ex vivo organ model | Lung diseases

UNIQUE SELLING POINTS OF THE TECHNOLOGY!

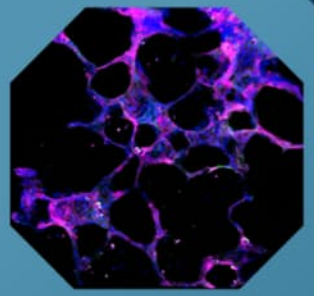
Alveolar epithelial type 2 cells

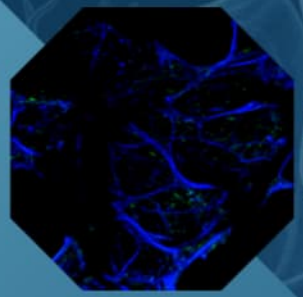
Endothelial cells



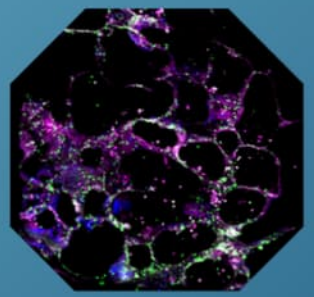


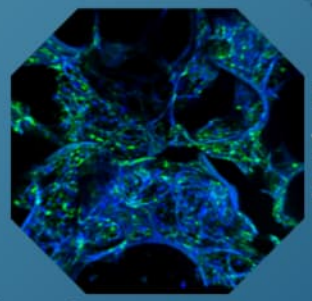
Native state human PCLS





PCLS without SHWAS





PCLS with SHWAS

"SHWAS preserves the physiological state of lung epithelium (AT2 cells) and vasculature (Endothelial cells)"

"SHWAS stimulates physiological air-based expansion and ventilation of the PCLS mimicking lung during respiration"

"SHWAS facilitates native exposure to various exposomes like cigarette smoke, inhaled drugs, air-borne pathogens"

"SHWAS allows for lung function readouts from PCLS"

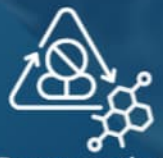
LUNG DISEASE APPLICATIONS

Drug discovery

Toxicity studies

Physiological research

Advanced disease modeling



Regenerative medicine

Alternative to animal testing

INVENTION DESCRIPTION

- Concept of air-based stretching and ventilation of PCLS
- Unique design of the culturing chamber
- Setup of the platform used for culturing PCLS and ventilation-based cargo delivery to PCLS
- Setup of the platform for advanced readouts like lung function

ADVANTAGES OVER THE STATE OF THE ART

- Existing chambers lack true physiological stretch that lung tissue experiences in a breathing organism
- Some chambers induce forced mechanical/cyclical stretching in the PCLS by membrane attachment which disrupts the natural architecture of the tissue
- No existing system supports AT2 cell homeostasis over longer periods
- Lung function readouts are not possible in submerged cultured PCLS

MARKET POTENTIAL

- Rising demand for in-vitro lung models driven by increasing respiratory diseases and the shift away from animal testing
- PCLS are highly relevant for studying airway constriction, inflammation, vasculature and evaluating new therapies for various lung diseases
- Global market size for in vitro lung models in 2024: USD 446.35 million, led by North America.
- Expected market size by 2031: USD 1,530.11 million (CAGR 19.4%)
- Overall market potential is steadily growing as demand is accelerating
- Source: https://www.theinsightpartners.com/de/reports/in-vitro-lung-model-market.