New Data from Emulate’s Asthma-on-Chip Presented at American Thoracic Society Annual Meeting

The data demonstrates new capabilities that recreate viral-induced exacerbations of asthma in vitro on the Small Airway Lung-Chip, a system that holds the potential to facilitate drug discovery and development for the treatment of severe asthma

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BOSTON, Mass. – Emulate Inc. presented data today that shows expanded functionality in modeling viral infection on the Small Airway Lung-Chip. This advancement opens new opportunities for studying viral-induced exacerbations of asthma using a human-relevant system. The data demonstrates the capability to model human airway tissue on the Small Airway Lung-Chip and to reproduce infection with a virus in vitro – recreating viral-induced exacerbation commonly experienced by asthma patients. The studies in the Small Airway Lung-Chip were carried out as part of a collaborative project between Emulate and Merck, known as MSD outside the United States and Canada.

The results of this collaborative research enable advanced human-relevant model systems that can lead to a better understanding of how viral infection worsens asthma symptoms, providing insights for developing new anti-inflammatory treatments, specifically for asthma. The research was presented at the American Thoracic Society annual meeting in Washington, DC, and showed:

• Recreation of airway tissue interfaces of the lung’s small airway, with differentiated mucociliary bronchiolar airway epithelium underlined by a microvascular endothelium which experiences fluid flow;

• Induction of a pro-inflammatory response characterized by cell death, goblet cells hyperplasia, and release of cytokines, when the Small Airway Lung-Chip was infected with human Rhinovirus (HRV), a leading cause of asthma exacerbation in children and adults;

• Effective modeling of molecular responses observed in severe asthma by showing altered interferon response and recruitment of circulating human neutrophils (immune cells);

• Pharmacological modulation of neutrophil recruitment by demonstrating that neutrophils, which drive innate inflammatory cell infiltration to the lungs in viral-induced asthma exacerbations, can be modulated by a selective CXCR2 antagonist drug agent.
“It has been a remarkable process for us to work with a leading pharmaceutical collaborator such as Merck, and our joint research has resulted in further advancing the capabilities of the Small Airway Lung-Chip,” said Geraldine A. Hamilton, Ph.D., President and Chief Scientific Officer of Emulate. “Our Lung-Chip has now achieved new levels of functionality to more accurately recreate human biology for airway inflammation and respiratory disease applications. We are excited to continue to apply the Small Airway Lung-Chip to potentially accelerate the discovery and development of better and safer drugs for patients with challenging inflammatory diseases of the lung, such as COPD, asthma, and respiratory infections.”

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Emulate and Merck have a multi-year research collaboration to deploy Emulate’s Organs-on-Chips technology for drug discovery and development applications, including development of more human-relevant systems to model inflammatory diseases and to better predict the potential human response of therapeutic candidates. The research collaboration focuses on using Emulate’s Small Airway Lung-Chip and Intestine-Chip for modeling inflammatory processes in the human lung and the gastrointestinal system. Current animal models for these applications can be limited in their relevance to humans in that their physiology can be distinctively different from the human, and the mechanisms driving key disease process can show marked species differences.

About The Lung-Chip
Emulate has developed Lung-Chip systems that recreate true-to-life functions of the human lung. Due to the distinct structure and biology of different parts of the lung and their differentiated role in disease processes, Emulate has developed a range of Lung-Chips that enable human-relevant research related to lung diseases and various aspects of lung biology. The Alveolar Lung-Chip emulates the fundamental lung functions such as oxygen-exchange and absorption in the breathing human lung and has been used in a range of applications, including evaluation of nanoparticle absorption and toxicity, study of disease development and assessment of adverse drug effects, such as pulmonary edema and pulmonary thrombosis. The Small Airway Lung-Chip models a different aspect of lung biology, distinct from the alveolar air sacs. It recapitulates the physiology and function of the airway epithelium that conduct inhaled air to the alveolar air sacs, and Emulate has demonstrated that the Small Airway Lung-Chip models inflammation and therapeutic responses in human small airway diseases, such as asthma and chronic obstructive pulmonary disease (COPD).
About the “Human Emulation System” Powered by Organs-On-Chips Technology
Based on the Organs-on-Chips technology, Emulate has created a new living Human Emulation System™ that provides a real-time window into the inner workings of human biology and disease – offering researchers a new technology designed to predict human response with greater precision and detail than today’s cell culture or animal-based experimental testing. Each of Emulate's proprietary Organ-Chips – such as the lung, liver, brain, intestine or kidney – contains tiny hollow channels lined with tens of thousands of living human cells and tissues, and is approximately the size of an AA battery. An Organ-Chip is a living, micro-engineered environment that recreates the natural physiology and mechanical forces that cells experience within the human body.

About Emulate, Inc.
Emulate Inc. is a privately held company that creates living products for understanding how diseases, medicines, chemicals, and foods affect human health. Our Human Emulation System™ sets a new standard for recreating true-to-life human biology and is being used to advance product innovation, design, and safety across a range of applications including drug development, agriculture, cosmetics, food, and chemical-based consumer products. Emulate continues to develop a wide range of Organ-Chips and disease models through collaborations with industry partners and internal R&D programs. Emulate is also working with clinical partners to produce Organ-Chips personalized with an individual patient's stem cells, for applications in precision medicine and personalized health. Our founding team pioneered the Organs-on-Chips technology at the Wyss Institute for Biologically Inspired Engineering at Harvard University. Emulate holds the worldwide exclusive license from Harvard University to a robust and broad intellectual property portfolio for the Organs-on-Chips technology and related systems.