

# Lung tissue generated from human embryonic stem cells

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Scientists in Belgium have successfully differentiated human embryonic stem cells (hESC) into major cell types of lung epithelial tissue using a convenient air-liquid interface. The technique, published in BioMed Central's open access journal *Respiratory Research*, could provide an alternative to lung transplants for patients with lung injury due to chronic pulmonary disease and inherited genetic diseases such as cystic fibrosis.

Lindsey Van Haute and colleagues from the Department of Embryology and Genetics at the Free University of Brussels (Vrije Universiteit Brussel) demonstrated for the first time that hESC could be converted into epithelial-like cells in human models. Van Haute and colleagues assessed hESC differentiation using an air-liquid interface system that mimicks the conditions found in an adult trachea. Expression data of lung-specific biomarkers from quantitative real-time RT-PCR supported the differentiation into lung epithelial cells. Furthermore, the combination of these mRNA expression results, as well protein expression, secretion and localization showed the presence of the major cell types of lung epithelial tissue.

This study demonstrates that hESC can differentiate into lung epithelial-like tissue without specific growth factors or embryoid body formation. The air-liquid interface on a porous membrane combined with low serum is sufficient to prime the cells to form an airway epithelial-like tissue.

"Efforts will be made to further improve this novel culture protocol,

trying to increase the number of differentiated cells or to guide the differentiation into particular cell types by adding certain growth factors to this system," says Van Haute. The team may start with fibroblast growth factors, which are important in the developing lung, to test whether their addition to the culture medium influences the differentiation pattern.

Van Haute continues, "hESC have the capacity to differentiate in vivo and in vitro into cells from all three germ lineages, making them particularly important in developmental biology, regenerative medicine and in vitro pharmacological studies. hESC lines carrying a monogenic disease affecting the lung, such as [cystic fibrosis](#), are available. This novel technique can be used on these affected hESC lines and provide researchers with putatively clinically relevant tools to develop in vitro models for these diseases."

More information: Generation of [lung](#) epithelial-like tissue from human [embryonic stem cells](#), Lindsey Van Haute, Gert De Block, Inge Liebaers, Karen Sermon and Martine De Rycke, *Respiratory Research* (in press), [respiratory-research.com/](http://respiratory-research.com/)

Source: BioMed Central ([news](#) : [web](#))

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