Introduction

Modeling of the human airway in vitro can be useful for a number of basic and applied research applications including the studies of viral infection, drug transport and toxicity, wound repair and disease modeling. To effectively recapitulate the human airway in vitro, primary human airway epithelial cells can be cultured at the air-liquid interface (ALI) using specialized media, resulting in differentiated cultures that exhibit morphological and functional characteristics that mimic the in vivo airway. In addition, primary airway epithelial cells can be expanded in submerged culture for several passages whilst retaining the ability to differentiate. We have recently launched Pneumacult™-ALI, a serum- and Bone Morphogenetic Protein (BMP)-free medium to support efficient mucociliary differentiation of primary human bronchial epithelial cells (HBECs) in ALI culture. Here we describe Pneumacult™-Ex, a serum- and BMP-free medium that supports rapid expansion of HBECs. Primary HBECs cultured in Pneumacult™-Ex can successfully undergo mucociliary differentiation when cultured in Pneumacult™-ALI medium, thus providing a fully-integrated serum- and BMP-free workflow for human airway modeling.

Results

**FIGURE 2:** HBECs cultured in Pneumacult™-Ex maintain a typical cobblestone morphology

**FIGURE 3:** HBECs cultured in Pneumacult™-Ex (BPE-free) and BEGM™ (containing BPE) show comparable expansion

**FIGURE 4:** HBECs cultured in Pneumacult™-Ex maintain widespread basal cell marker expression

**FIGURE 5:** HBECs cultured in Pneumacult™-Ex successfully differentiated in Pneumacult™-ALI

**FIGURE 6:** The time course of trans epithelial electrical resistance (TEER) for the HBECs cultured in Pneumacult™-ALI

**FIGURE 7:** Dynamic changes of marker gene expression suggest successful differentiation of HBECs cultured in Pneumacult™-ALI

Conclusions

- Pneumacult™-Ex is a serum- and BMP-free medium that supports the expansion of primary human bronchial epithelial cells (HBECs).
- By supporting efficient expansion of primary HBECs in monolayer culture, Pneumacult™-Ex enables generation of large numbers of cells for use in respiratory research, toxicity testing and drug development.
- HBECs cultured in Pneumacult™-Ex maintain an epithelial cell morphology and expression of key basal cell markers, p63 and p75NH2.
- Pneumacult™-Ex, together with Pneumacult™-ALI creates an optimized BMP-free culture system for differentiating HBECs into a pseudostratified mucociliary epithelium resembling the human airway.

TOLL-FREE PHONE 1 800 687 0822 PHONE 1 604 677 0713 TECH SUPPORT@STEMCELL.COM INFO@STEMCELL.COM WWW.STEMCELL.COM FOR RESEARCH USE ONLY. NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES.