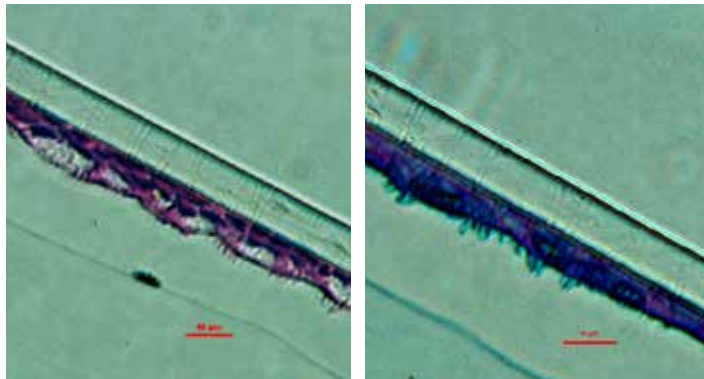


# PRIMARY HUMAN RESPIRATORY CELLS

## FUNCTIONAL MODELS OF AIRWAY PHYSIOLOGY

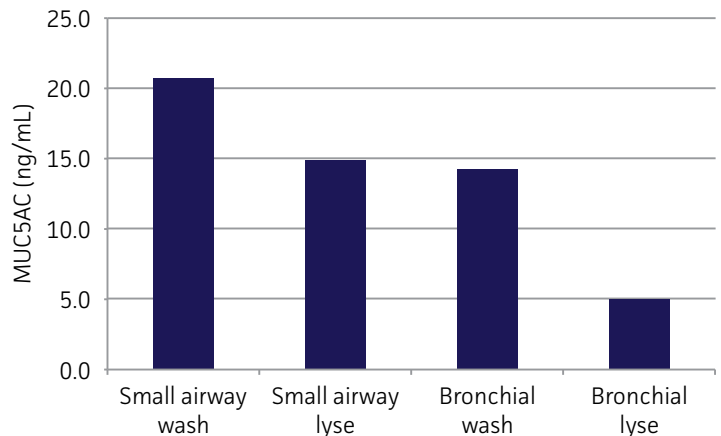
ATCC® provides primary airway epithelial cells, smooth muscle cells (SMCs), and fibroblasts, as well as growth media and media supplements for *in vitro* models to boost the scientific relevance of upper respiratory studies. Primary airway cells can be applied in a wide range of experiments in drug discovery, toxicological screening, assay development, as well as tissue and organ physiology<sup>1</sup>. For example, primary human bronchial/tracheal epithelial cells, when cultured in a 3-D air-liquid interface culture system, display functional characteristics such as (Figure 1 and 2):

- Cilia formation<sup>2,3</sup>
- Pseudostratified epithelium formation<sup>2,3</sup>



**Figure 1. Cell Differentiation in 3D** Primary bronchial/tracheal epithelial cells at 28 days post airlift stained with A) H&E, indicating cilia and goblet cells. B) Cross sections of the cells reveal PAS/Alcian blue stained-vesicles, which suggest mucus synthesis. These results have also been observed in primary small airway cells.

- Goblet cell formation<sup>2,3</sup>
- Mucus secretion<sup>3</sup>



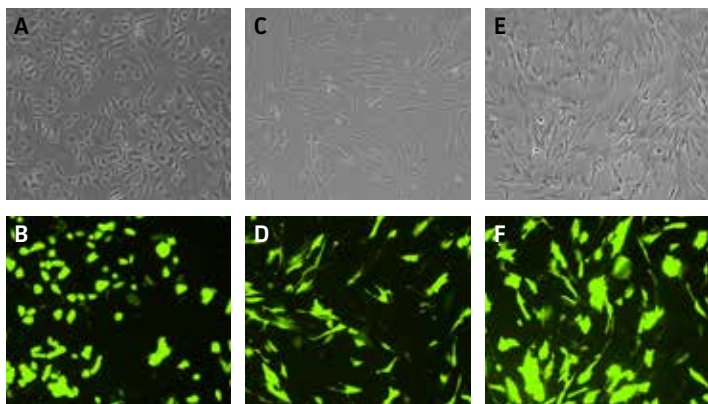
**Figure 2. Mucus Secretion** MUC5AC (an indicator of mucus secretion), monitored via ELISA assay, from the supernatant after a PBS wash or from the lysate of small airway and bronchial tracheal epithelial cells.

## WELL CHARACTERIZED, HIGH PERFORMANCE PRIMARY CELLS

ATCC primary airway cells are consistently isolated and processed, minimizing the variation between individual vials as well as production lots. Specification and characterization for each lot of cells:

- Provided at passage 2
- At least  $5 \times 10^5$  viable cells per vial
- Capable of > 15 population doublings
- Tested for positive and negative cell-specific markers
- Greater than 70% post thaw viability
- Normal cell morphology
- Gender, age, ethnicity, and cause of death information available
- Negative for bacteria, yeast, fungi, viruses, and mycoplasma





**Figure 3.** Enhanced GFP constructs were introduced into A and B) Primary Bronchial/Tracheal Epithelial Cells, C and D) Airway SMCs, and E and F) Bronchial/Tracheal SMCs using TransfeX™.

### HIGH VIABILITY HOSTS FOR TRANSFECTION

In search of primary airway cells that are amenable to nucleic acid transfer for your genetic manipulation experiments? ATCC primary airway cells exhibit high viability and gene uptake when transfected with TransfeX™ Transfection Reagent (ATCC® ACS-4005) as indicated in Figure 3:

- 65% efficiency in primary epithelial cells
- 70% efficiency in airway SMCs
- 70% efficiency in primary bronchial/tracheal SMCs

To get started with your gene transfer experiments explore ATCC transfection reagents and primary cell-specific transfection protocols at [www.atcc.org/transfection](http://www.atcc.org/transfection).

### PRIMARY CELLS, SUPPORTING MEDIA, AND GROWTH KITS

Cell Type	Product Name	ATCC® No.	Number of Cells/vial	Growth Kit	Basal Media
Epithelial Cells	Bronchial/Tracheal Epithelial Cells	PCS-300-010	500,000	Small Airway Epithelial Growth Kit (ATCC® PCS-301-040) or Bronchial Epithelial Cell Growth Kit (ATCC® PCS-300-040)	Airway Epithelial Cell Basal Medium (ATCC® PCS-300-030)
	Small Airway Epithelial Cells	PCS-301-010	500,000		
Smooth Muscle Cells	Bronchial/Tracheal Smooth Muscle Cells	PCS-130-011	500,000	Vascular Smooth Muscle Cell Growth Kit (ATCC® PCS-100-042)	Vascular Cell Basal Medium (ATCC® PCS-100-030)
	Lung Smooth Muscle Cells	PCS-130-010	500,000		
Fibroblasts	Lung Fibroblasts	PCS-201-013	500,000	Fibroblast Growth Kit – Low Serum (ATCC® PCS-201-041)	Fibroblast Basal Medium (ATCC® PCS-201-030)

### REFERENCES

1. Berube K, *et al.* Human primary bronchial lung cell constructs: the new respiratory models. *Toxicology* 278(3):311-8, 2010.
2. Briley A, Zhang CK, Shapiro B. Human bronchial/tracheal epithelial cells: Improving functional studies. [Application Note Number 14](#), 2014.
3. Pulliam J. 3D tissue modeling. *ATCC Excellence in Research Webinar*, 2014.

For ATCC Primary Human Respiratory Cells, as well as other respiratory research resources, explore [www.atcc.org/respiratory](http://www.atcc.org/respiratory).

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