

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 physiology¹. 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^{2,3}
- Pseudostratified epithelium formation^{2,3}
- Goblet cell formation^{2,3}
- Mucus secretion³

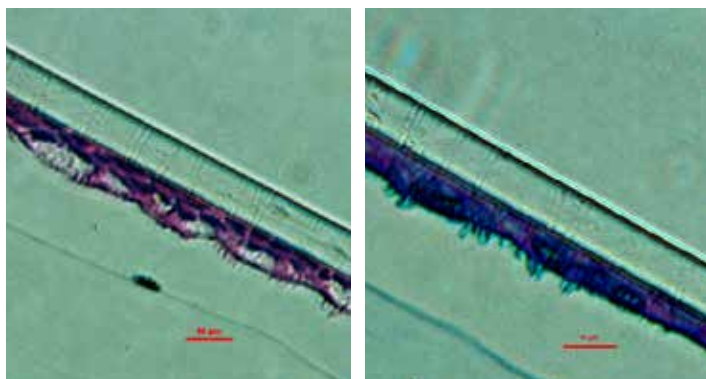


FIGURE 1. Cell Differentiation in 3D Primary bronchial/tracheal epithelial cells at 28 days post airlift stained with A) H&E, indicating cilia and goblet cells. B) Cross sections of the cells reveal PAS/Alcian blue stained-vesicles, which suggest mucus synthesis. These results have also been observed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

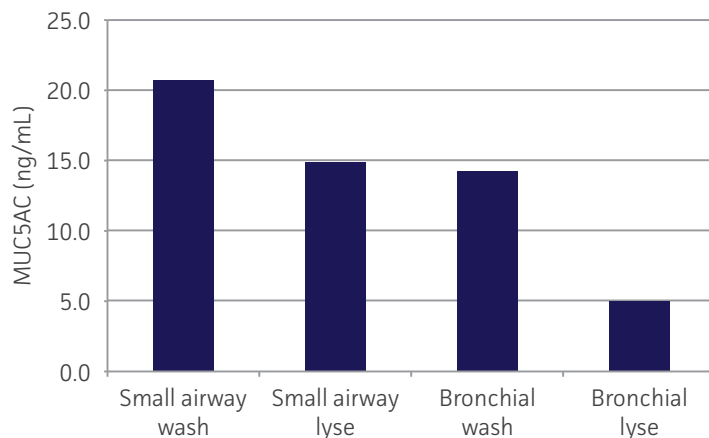


FIGURE 2. Mucus Secretion MUC5AC (an indicator of mucus secretion), monitored via ELISA assay, from the supernatant after a PBS wash or from the lysate of small airway and bronchial tracheal epithelial cells.

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 5×10^5 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



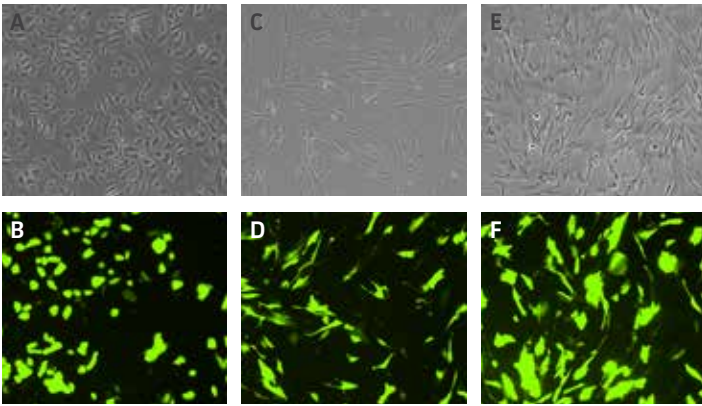


FIGURE 3. Enhanced GFP constructs were introduced into A and B) Primary Bronchial/Tracheal Epithelial Cells, C and D) Airway SMCs, and E and F) Bronchial/Tracheal SMCs using TransfeX™.

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

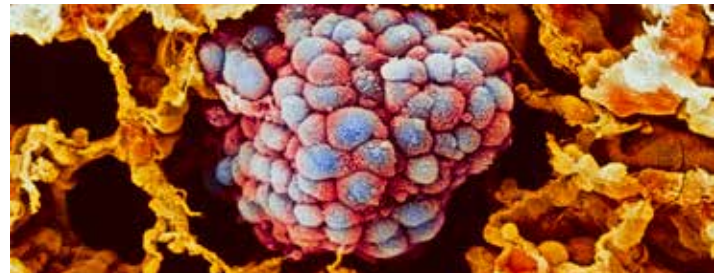
To get started with your gene transfer experiments explore ATCC transfection reagents and primary cell-specific transfection protocols at www.atcc.org/transfection.

TABLE 1. 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	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		
	Primary Lobar Epithelial Cells	PCS-300-015	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)

Disease Human Respiratory Cells

Disease human primary human respiratory cells can improve your model of respiratory illness, whether it be microbial (e.g., viral, bacterial) infection and pathogenesis, airway inflammation and wound healing, asthma, pulmonary fibrosis, chronic obstructive pulmonary disease (COPD), or emphysema. Used with normal primary respiratory cells from healthy individuals, these cells increase the relevance of toxicology, disease pathogenesis, and drug discovery studies.



Disease State	Cell Type	ATCC® No.	Number of Cells/vial	Growth Kit	Basal Media
Asthma	Bronchial/tracheal Epithelial Cells	PCS-300-011	500,000	Small Airway Epithelial Growth Kit (ATCC® PCS-301-040™) or	Airway Epithelial Cell Basal Medium (ATCC® PCS-300-030™)
	Small Airway Epithelial Cells	PCS-301-011	500,000	Bronchial Epithelial Cell Growth Kit (ATCC® PCS-300-040™)	
	Lung Smooth Muscle Cells	PCS-130-012	500,000	Vascular Smooth Muscle Cell Growth Kit (ATCC® PCS-100-042™)	Vascular Cell Basal Medium (ATCC® PCS-100-030™)
	Bronchial/tracheal Smooth Muscle Cells	PCS-130-015	500,000		
	Lung Fibroblasts	PCS-201-015	500,000	Fibroblast Growth Kit – Low Serum (ATCC® PCS-201-041™)	Fibroblast Basal Medium (ATCC® PCS-201-030™)


Disease State	Cell Type	ATCC® No.	Number of Cells/vial	Growth Kit	Basal Media
COPD	Bronchial/tracheal Epithelial Cells	PCS-300-012	500,000	Small Airway Epithelial Growth Kit (ATCC® PCS-301-040™) or	Airway Epithelial Cell Basal Medium (ATCC® PCS-300-030™)
	Small Airway Epithelial Cells	PCS-301-013	500,000	Bronchial Epithelial Cell Growth Kit (ATCC® PCS-300-040™)	
	Bronchial/tracheal Smooth Muscle Cells	PCS-130-017	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-130-014	500,000		
	Lung Fibroblasts	PCS-201-017	500,000	Fibroblast Growth Kit – Low Serum (ATCC® PCS-201-041™)	Fibroblast Basal Medium (ATCC® PCS-201-030™)
Cystic Fibrosis	Bronchial/tracheal Epithelial Cells	PCS-300-013	500,000	Small Airway Epithelial Growth Kit (ATCC® PCS-301-040™) or	Airway Epithelial Cell Basal Medium (ATCC® PCS-300-030™)
	Small Airway Epithelial Cells	PCS-301-012	500,000	Bronchial Epithelial Cell Growth Kit (ATCC® PCS-300-040™)	
	Lung Smooth Muscle Cells	PCS-130-013	500,000	Vascular Smooth Muscle Cell Growth Kit (ATCC® PCS-100-042™)	Vascular Cell Basal Medium (ATCC® PCS-100-030™)
	Bronchial/tracheal Smooth Muscle Cells	PCS-130-016	500,000		
	Lung Fibroblasts	PCS-201-016	500,000	Fibroblast Growth Kit – Low Serum (ATCC® PCS-201-041™)	Fibroblast Basal Medium (ATCC® PCS-201-030™)
Fibrosis	Bronchial/tracheal Epithelial Cells	PCS-300-014	500,000	Small Airway Epithelial Growth Kit (ATCC® PCS-301-040™) or	Airway Epithelial Cell Basal Medium (ATCC® PCS-300-030™)
	Small Airway Epithelial Cells	PCS-301-014	500,000	Bronchial Epithelial Cell Growth Kit (ATCC® PCS-300-040™)	
	Lung Smooth Muscle Cells	PCS-130-018	500,000	Vascular Smooth Muscle Cell Growth Kit (ATCC® PCS-100-042™)	Vascular Cell Basal Medium (ATCC® PCS-100-030™)
	Bronchial/tracheal Smooth Muscle Cells	PCS-130-019	500,000		
	Lung Fibroblasts	PCS-201-020	500,000	Fibroblast Growth Kit – Low Serum (ATCC® PCS-201-041™)	Fibroblast Basal Medium (ATCC® PCS-201-030™)

* Please note: Due to the unique nature of these tissues, inventory of the above cells may be limited at times.

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 explore www.atcc.org/primarycellselection

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