



## TransfeX™ Transfection of Plasmid DNA into Primary Lung Smooth Muscle Cells (PCS 130-010™) and Primary Bronchial/Tracheal Smooth Muscle Cells (PCS 130-011™)

Primary, normal human airway smooth muscle cells (ATCC® Cat. No. PCS-130-010™) and Bronchial-Tracheal cells (PCS-130-011™) are isolated from normal lung and bronchia-trachea. ATCC has achieved transfection efficiencies of approximately 70% using the protocol described below.

### General Considerations for using the TransfeX transfection reagent:

- All steps should be performed in a biosafety cabinet using proper aseptic technique.
- **Cell conditions.** Cells should be passaged at least once after thaw and the use of low-passage cells is recommended. Passage the cells 18-24 hours before transfection to ensure the cells are actively dividing and that they will be at the appropriate cell density at the time of transfection. Make sure that the cells are healthy and are ≥ 90% viable, prior to transfection.
- **Seeding density.** Cell density should be 60-70% confluent on the day of transfection. See specified seeding density in the individual protocols and in Table 1. *Note: Determine the optimal cell density for each cell type in order to maximize transfection efficiency.*
- **DNA purity.** Use highly purified plasmid preps that are free from phenol or other contaminants. Plasmid DNA preps that are endotoxin-free are desirable.
- **Presence of antibiotics and other inhibitors.** Antibiotics will inhibit transfection complex formation and therefore should be excluded from the complex formation step. Transfection complexes can be added to cells grown in complete culture medium containing serum and low levels of antibiotics if required.
- **Complex formation conditions.** Prepare TransfeX Reagent and DNA complexes in serum-free growth medium. ATCC recommends using Opti-MEM I Reduced-Serum Medium to dilute the DNA before complex formation.

### Materials required:

Material Required	Catalog No.
Primary Lung Smooth Muscle Cells	ATCC® PCS-130-010™
Primary Bronchial-Tracheal Smooth Muscle Cells	ATCC® PCS-130-011™
Vascular Cell Basal Medium	ATCC® PCS-100-030™
Vascular Smooth Muscle Cell Growth Kit	ATCC® PCS-100-042™
TransfeX™	ATCC® ACS-4005
Opti-MEM® I Reduced-Serum Media	Life Technologies™ 31985-062
Plasmid DNA of interest (1µg/µL)	
Tissue culture plates and supplies	



## TransfeX™ Transfection of Plasmid DNA into primary Bronchial/Tracheal and Lung Smooth Muscle Cells

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### Protocol:

The following protocol describes how to transfect plasmid DNA into primary airway cells using the TransfeX Reagent in **a single well of a 12 well plate**. The reaction may be scaled up as needed. Please refer to Table 1 for recommended reaction conditions for other dish or plate sizes.

#### A. Preparation of the cells for transfection

##### The day before transfection:

1. Count and measure cells for density and viability.
2. Plate **80,000** cells per well in complete growth medium (**Vascular Cell Basal Media supplemented with the Vascular Smooth Muscle Cell Growth Kit**). Cell density should be **60-70%** confluent on the day of transfection.
3. Incubate cells overnight at **37°C** with **5% CO<sub>2</sub>**.

##### The day of transfection:

1. Remove old media.
2. Replace old media with fresh complete growth media (excluding Heparin Sulfate) to a total volume of 1.0 mL/well.

#### B. Preparation of the DNA:TransfeX transfection complexes

1. Warm TransfeX, plasmid DNA, and Opti-MEM I Reduced-Serum Medium to room temperature and vortex gently to mix.
2. Pipette **100 µL** Opti-MEM I Reduced-Serum Medium into a sterile microcentrifuge tube.
3. Add **0.5 µL** (1.0 µg/µL) plasmid DNA.
4. Mix thoroughly with gently pipetting.
5. Add **1.0 µL** TransfeX Reagent to the diluted DNA mixture. *Note: Do not let the pipette tip or the reagent come into contact with the sides of the plastic tube.*
6. Mix TransfeX:DNA complexes thoroughly using either a vortex or by pipetting briefly.
7. Collect contents at bottom of the tube using a mini-centrifuge.
8. Incubate TransfeX:DNA complexes at room temperature for 15 minutes.

#### C. Addition of DNA:TransfeX transfection complexes to the cells

1. Distribute the complexes to the cells by adding the complexes drop-wise to different areas of the wells.
2. Gently rock the culture vessel back and forth and from side to side to evenly distribute the TransfeX:DNA complexes.

#### D. Post-Transfection Handling

1. Incubate for **24-72** hours. Do not replace media post transfection as this may disrupt the cell monolayer.
2. Wait for 24-72 hours post-transfection before assaying for transgene expression

**ATCC**<sup>®</sup>**TransfeX™ Transfection of Plasmid DNA into primary Bronchial/Tracheal and Lung Smooth Muscle Cells****Table 1: Recommended Reaction Conditions for different size culture vessels.**

Culture Vessel	96 well plate	24 well plate	12 well plate	6 well plate	6-cm dish	10 cm dish
Surface area	0.35 cm <sup>2</sup>	1.9 cm <sup>2</sup>	3.8 cm <sup>2</sup>	9.6 cm <sup>2</sup>	21.5 cm <sup>2</sup>	59 cm <sup>2</sup>
Cell seeding	0.70 x 10 <sup>4</sup> per well	4.0 x 10 <sup>4</sup> per well	8.0 x 10 <sup>4</sup> per well	19 x 10 <sup>4</sup> per well	43 x 10 <sup>4</sup> per well	118 x 10 <sup>4</sup> per well
Complete Growth Medium	0.1 mL	0.5 mL	1.0 mL	2.0 mL	5.0 mL	10 mL
Opti-MEM I Reduced Serum Medium	20 µL	50 µL	100 µL	200 µL	500 µL	1.0 mL
DNA (1 µg/µL stock)	0.125 µg	0.25 µg	0.5 µg	1.0 µg	2.0 µg	6 µg
TransfeX Reagent	0.25 µL	0.5 µL	1.0 µL	2.0 µL	4.0 µL	12 µL

**Cell line specific notes:**

1. Include a control condition consisting of an empty vector plasmid or a plasmid expressing GFP.
2. Transfection should not be performed in heparin-containing differentiation media as efficiency will be greatly inhibited.
3. We recommend transfecting un-differentiated cells as post-differentiation, transfection efficiency is much lower.
4. To generate transfected, differentiated cells we suggest following the above protocol but replacing the complete growth media with differentiation media 24h after incubation with the transfection complexes.

**Figure 1.** GFP expression in (A) Primary Normal Human Lung Smooth Muscle Cells (PCS-130-010) and (B) Primary Normal Human Bronchial-Tracheal Smooth Muscle Cells (PCS-130-011) transfected with 1  $\mu$ L of TransfeX<sup>™</sup> Transfection Reagent and 0.5  $\mu$ g of an EF1 $\alpha$ -eGFP vector per well of a 12-well plate day 2 post-transfection (10x).

