Features

- 3D Tissue Model of Nasal Epithelium
- Pseudostratified Morphology
- Ciliated Apical Surface
- Mucin Producing
- *In Vivo*-Like Barrier
- Tight Junctions
- Highly Reproducible
- Easily Handled Cell Culture Inserts
- Cost Effective Preclinical Screening

Key Applications

- Respiratory Pathogenic Studies
- Drug Delivery Optimization
- Inhalation Toxicology
- Drug Formulations
- Environmental Agents
- Occupational Chemicals
- Nanomaterials

Additional Features

- Weekly delivery
- Shipment from the US
- Available Worldwide
- Customized media formulations*

* Available anti-fungal free, antibiotic free, hydrocortisone free and phenol red free

The EpiNasal Model

Mattek's EpiNasal is a three-dimensional tissue model that consists of normal, human-derived nasal epithelial cells. These cells are cultured at the air-liquid interface to form a multi-layered, highly differentiated tissue that closely resembles the physiological and morphological aspects of the human nasal epithelium. Immunostained cross-sections indicate the presence of tight junctions, apical cilia, goblet cells, and mucin secretion (Figure 2). Further, transepithelial electrical resistance (TEER) measurements of EpiNasal are consistent batch to batch (Table 1).

EpiNasal is a reliable, cost-effective, and sustainable alternative to animal testing. It is useful for studying anti-viral drugs and other compounds to prevent viral and bacterial infections, inhalation drug delivery, and gas phase exposure leading to inflammation or irritation. EpiNasal provides a more relevant platform for human respiratory research versus two-dimensional cultures and nonhuman studies.
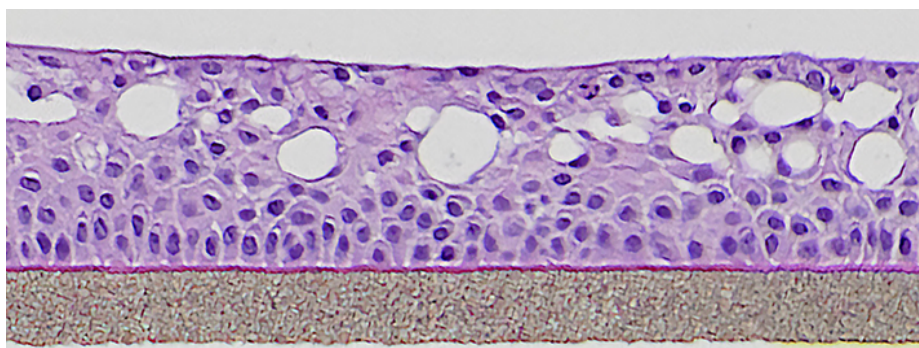
Histology of EpiNasal

Figure 1. H&E histological cross-section of EpiNasal.

Applications

Viral Studies
In addition to containing functional epithelial cells that mimic the *in vivo* environment, EpiNasal contains ACE2 receptors important in SARS-CoV-2 infection (Figure 3) [1]. Researchers have used EpiNasal to determine viral infection and replication [2] and to study the efficacy of novel compounds to prevent infection with SARS-CoV-2.

Toxicity Studies
EpiNasal responds in a dose dependent manner to known irritants and can be used to study the potential toxic effects of inhaled compounds. Researchers exposed EpiNasal to butylamine, a known mucus membrane irritant, and determined toxicity through measurement of TEER (Figure 4) [3].
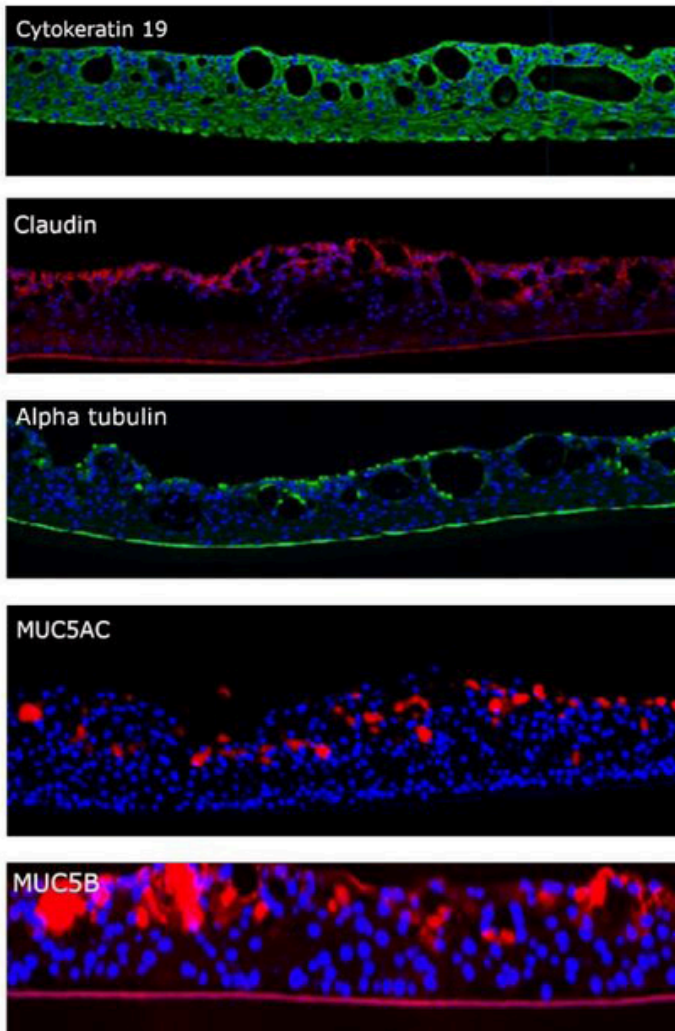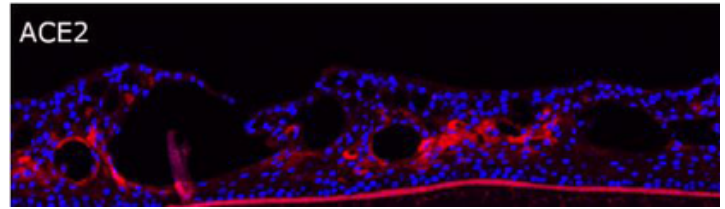
Figure 3. EpiNasal expresses ACE2 receptors. Cross sections of EpiNasal stained for ACE2 (red): a receptor important in SARS-CoV-2 infection. Blue staining indicates nucleistained by DAPI.

Table 1. Barrier integrity and reproducibility of EpiNasal tissue as measured by TEER.

TEER

Lot #	$\Omega*cm^2$	Std
32910	230.7	18.2
32913	257.4	51.0
32916	351.8	52.2
32920	215.7	14.8
32921	203.0	40.0
32922	359.6	34.1
32923	461.7	38.6
32925	384.0	83.3
32928	243.8	50.4
Mean	300.9	42.4

Figure 2. Characterization of EpiNasal. Cross sections of EpiNasal stained for Cytokeratin 19 (green): a marker of epithelial cells, Claudin (red): a marker of tight junctions, alpha tubulin (green): a marker of cilia and Muc5AC/MUC5B (red): markers of mucus producing goblet cells. In all images, blue staining indicates nuclei stained by DAPI.
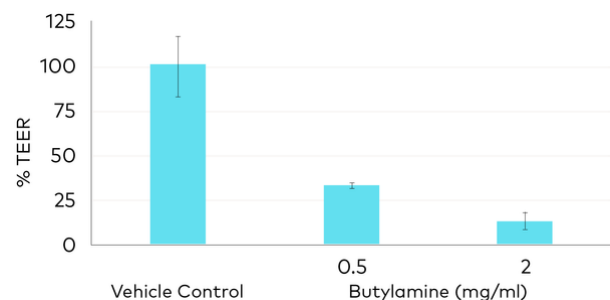

Figure 4. Effect of butylamine on EpiNasal. TEER measurements were taken following a 4hr topical exposure of EpiNasal to butylamine, a known mucous membrane irritant. Vehicle control was corn oil.

1. Ahn, J.H., et al., Nasal ciliated cells are primary targets for SARS-CoV-2 replication in the early stage of COVID-19. Journal of Clinical Investigation, 2021. 131(13).
2. Jung KH, S.M., Hansen JK, Choi J-A, Westover JB, Hurst BL, Replication and antiviral activity of MERS and SARS-CoV-2 variants in a highly specialized 3D mucociliary tissue model consisting of normal human-derived tracheal bronchial epithelial cells. Int Soc Antiviral Res, 2022.
3. Ayehunie S, D.M., Stevens Z, Oh J, Kaluzhny Y, Armento A, Organotypic 3D primary human nasal tissue model for toxicological studies. SOT 2022, 2022.

MATTEK
Now Part of Sartorius

Mattek North America Headquarters
200 Homer Ave.
Ashland, MA. 01721
US: +1 (508) 881-6771

For further information, visit
www.mattek.com or email
support@mattek.com