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EpiIntestinal | Data Sheet

Features

- 3D Human Small Intestinal (SI) Tissue Model
- Reconstructed from Normal, Human SI Cells
- Highly Differentiated, *in vivo*-like Structure
- Phenotype and Function of *In Vivo* SI Tissue
- Highly Reproducible
- Easily-handled Cell Culture Inserts
- Bridges the Gap Between Cell-based and Animal Discover Research

Ideal Applications

- Drug Permeation
- Safety of Therapeutic Candidates
- Host-pathogen Interaction
- Intestinal Inflammation
- Intestine Epithelial Restitution

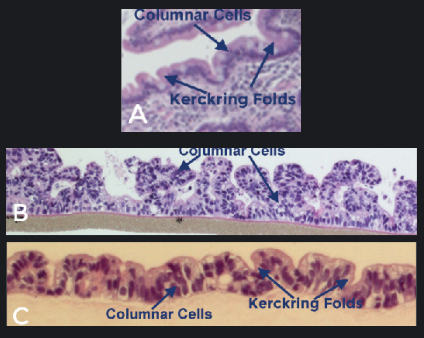

Figure 1. Tissue Morphology - H&E stained histological (formalin fixed) cross-sections of: **A)** human small intestine explant tissue **B)** partial thickness EpiIntestinal (SMI-100) and **C)** full thickness EpiIntestinalFT (SMI-100-FT).

The EpiIntestinal Model

The epithelial lining of the gastrointestinal (GI) tract is a gatekeeper for entry of orally ingested nutrients and xenobiotics including medicaments. The small intestine has a well organized structure containing proliferative cells which migrate along the crypt-villi axis and differentiate into functionally mature epithelial cells. To enable *in vitro* study of the small intestinal epithelium, Mattek has developed EpiIntestinal, a model of the human small intestine.

EpiIntestinal is a 3D reconstructed tissue model produced from normal, human-derived small intestine epithelial and endothelial cells and fibroblasts (EpiIntestinalFT) (Figure 1). The highly differentiated tissue model is produced at the air-liquid-interface (ALI) in easy-to-handle tissue culture inserts using serum-free medium. Structural analysis of the tissue model demonstrates columnar shaped basal cells and Kerckring folds (Figure 1). Ultrastructurally, EpiIntestinal exhibits brush borders, functional tight junctions and mucous secreting granules mimic the *in vivo* tissue (Figure 2).

Structure of EpiIntestinal & EpiIntestinalFT

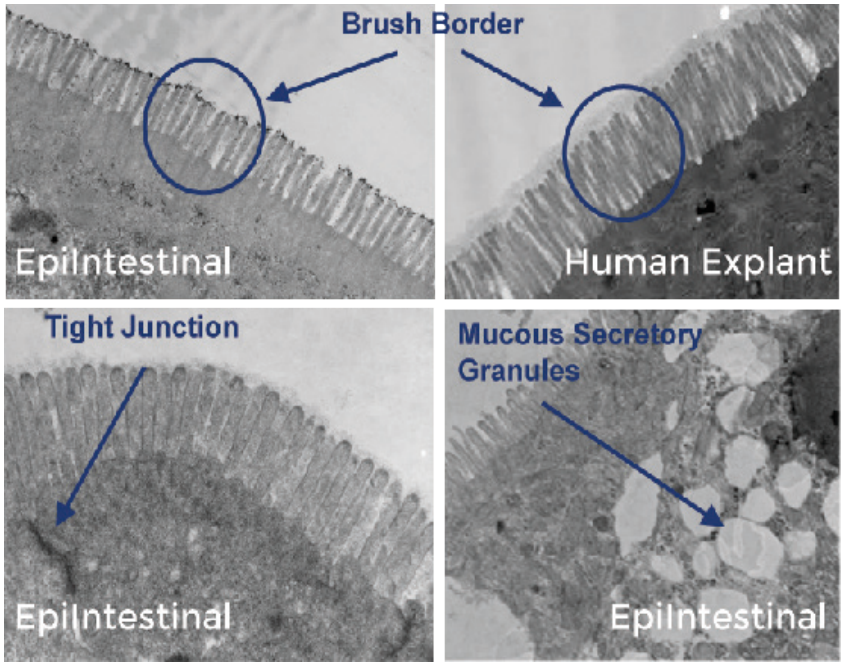

Figure 2. Ultrastructure - Transmission electron micrographs (TEM) of EpiIntestinal and human small intestine explant tissue showing brush border membranes, tight junctions and mucous secretory granules.

EpiIntestinal exhibits an *in vivo*-like phenotype as evidenced by expression of differentiation marker Cytokeratin 19 (CK19), tight junction marker (Claudin) and efflux transporter (P-gp) (Figure 3). Efflux drug transporters P-glycoprotein (MDR1), BCRP, MRP1, and MRP2 are also expressed in the tissue model (Figure 4).

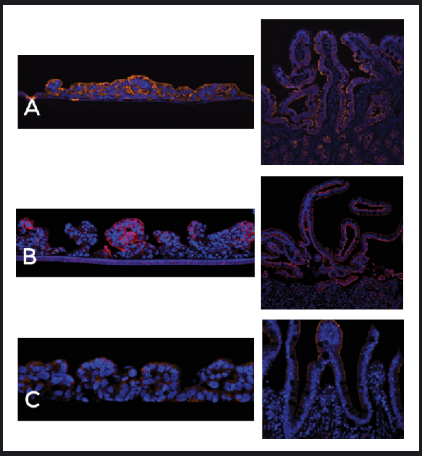

Figure 3. Protein Expression.
Expression of A) CK19, B) Claudin and C) P-gp in EpiIntestinal (left column) and human small intestine explant tissue (right column).

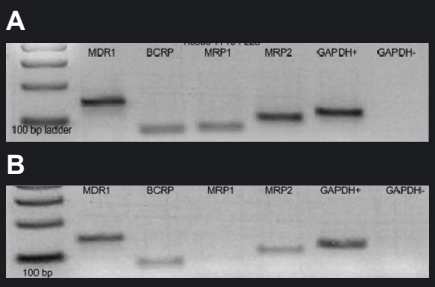

Figure 4. Gene Expression.
Efflux transporters: P-glycoprotein (MDR1), BCRP, MRP1, and MRP2 by **A)** EpiIntestinal and **B)** human small intestine explant tissue.

Tissue Lot # (all lots from same donor)	TEER VALUES	
	Ω * cm^2	St. Dev.
17232	132	7.2
17241	136	1.7
17245	123	7.6
17249	114	11.0
17252	130	11.0
17242	146	10.2
17247	125	3.4
17253	139	4.2

Figure 5. Barrier Function - Trans Epithelial Electrical Resistance (TEER) of independent production lots of EpiIntestinal.

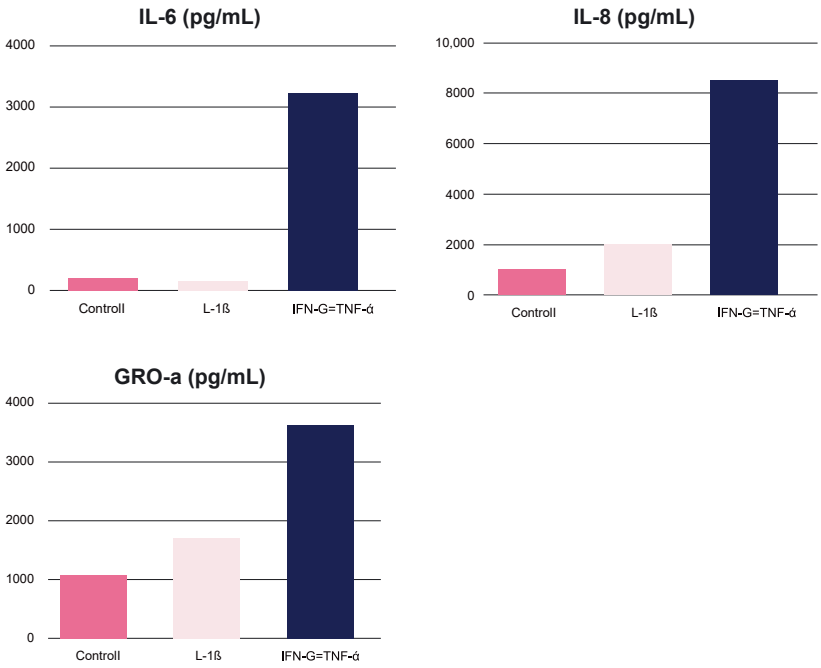

Figure 6. Inflammatory Response. Cytokine release by EpiIntestinal following a 24 hour exposure to IL-1b or TNF-a + IFN-g. Culture supernatants were collected and analyzed using the BioPlex suspension Array System.

Various drug development and toxicology laboratories are actively seeking alternatives to current *in vitro* models or whole animal testing. The availability of the EpiIntestinal tissue model will serve as a tool to evaluate the safety and absorption of therapeutic drug candidates and allow the study of intestinal inflammation, microbial infections and intestinal epithelial restitution.

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