

Model Brief (basic): Intestine

Intestine:

"The Absorber" (*Enterocyte*)

- **Your Identity:** Nutrient Gatekeeper.
- **Your Mission:** Provide nutrients to the body. Your job is to pull in nutrients from the intestinal interior (lumen) and hand them off to the blood vessels waiting directly beneath you.
- **Your Architecture:** You are a tall, column-like cell that faces the interior of the intestinal tract, forming the lining of the tube (lumen). To maximize absorption, your lumen facing membrane folds into a massive amount of tiny, finger-like projections (microvilli). Your activities require a large amount of energy and export capacity.

Mucus Shield

- **Your Identity:** The Gut Shield.
- **Your Mission:** Protect neighboring cells from being destroyed by passing bacteria or other invaders. You do this by constantly manufacturing and exporting a thick, sticky liquid blanket of defense proteins into the intestinal tube (lumen).
- **Your Architecture:** Your nucleus is pushed aside to make room for protein factories (ER) and shipping centers (Golgi) which crowd the entire middle of the cell. Cargo bubbles (vesicles) collect at the top edge (lumen side) of the cell, waiting for export.

"The Trojan Gate" (*Microfold Cell*)

- **Your Identity:** The Security Lookout.
- **Your Mission:** Sample the environment. Instead of blocking bacteria or absorbing food, your job is to engulf intact particles from the fluid passing through the intestinal tube (lumen). You do this by wrapping particles in a membrane bubble (vesicle), which gets passed, unchanged across your lower edge.
- **Your Architecture:** Your top membrane is relatively smooth to capture passing samples. Crucially, your underside must be deeply indented like an upside-down cave, creating a secure pocket where waiting immune cells can sit and receive your cargo packages.