



AL-Mustaqbal University College
Department of Pharmacy
Physiology 2nd stage



GIT Physiology Lec 4

Digestion and Absorption

By: Lecturer
Weam J. Abass

Outline

food // Carbohydrate , fat and proteins .

Hydrolysis

Villi, micriviilli , brush border

Enterocyte

Suffix ---
ase

Enzyme / Lipase ; amylase ; peptidase

Bile salt , micelles

Absorption

Overview of food molecules

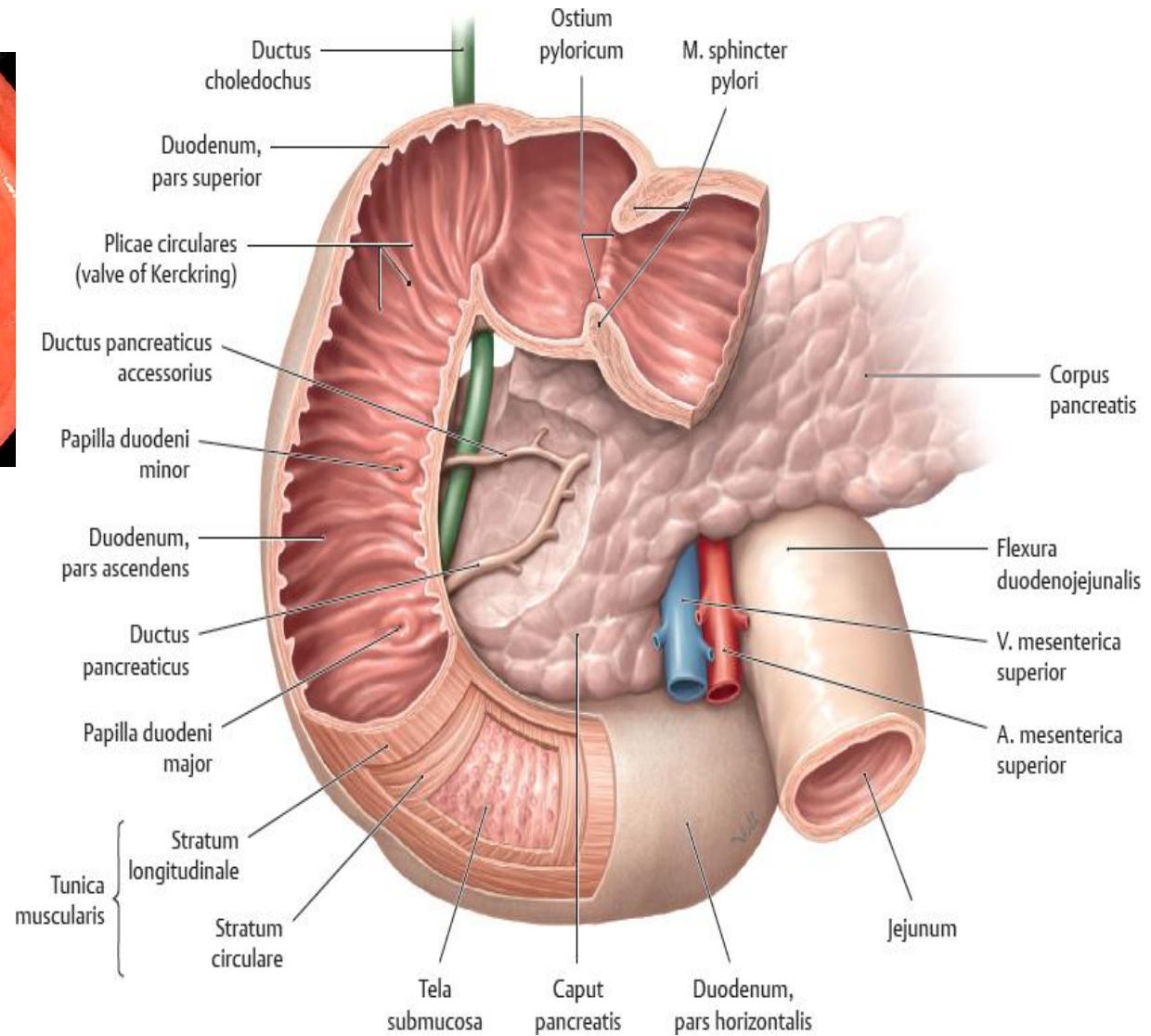
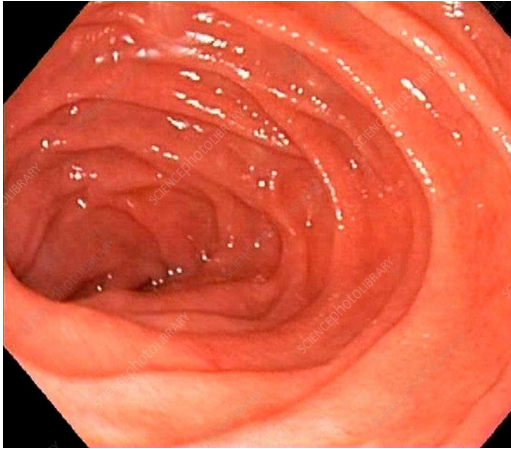
Polysaccharides
disaccharides
Monosaccharide

Protein - Peptide
,Amino acid

**Fat //triglycerides (neutral
fats 3fatty acid +a single
glycerol molecule.**
Cholesterol



Folds of Kerckring (valvulae conniventes)



1-Folds of Kerckring (valvulae conniventes)

**2-Villi,
and
Microvilli**

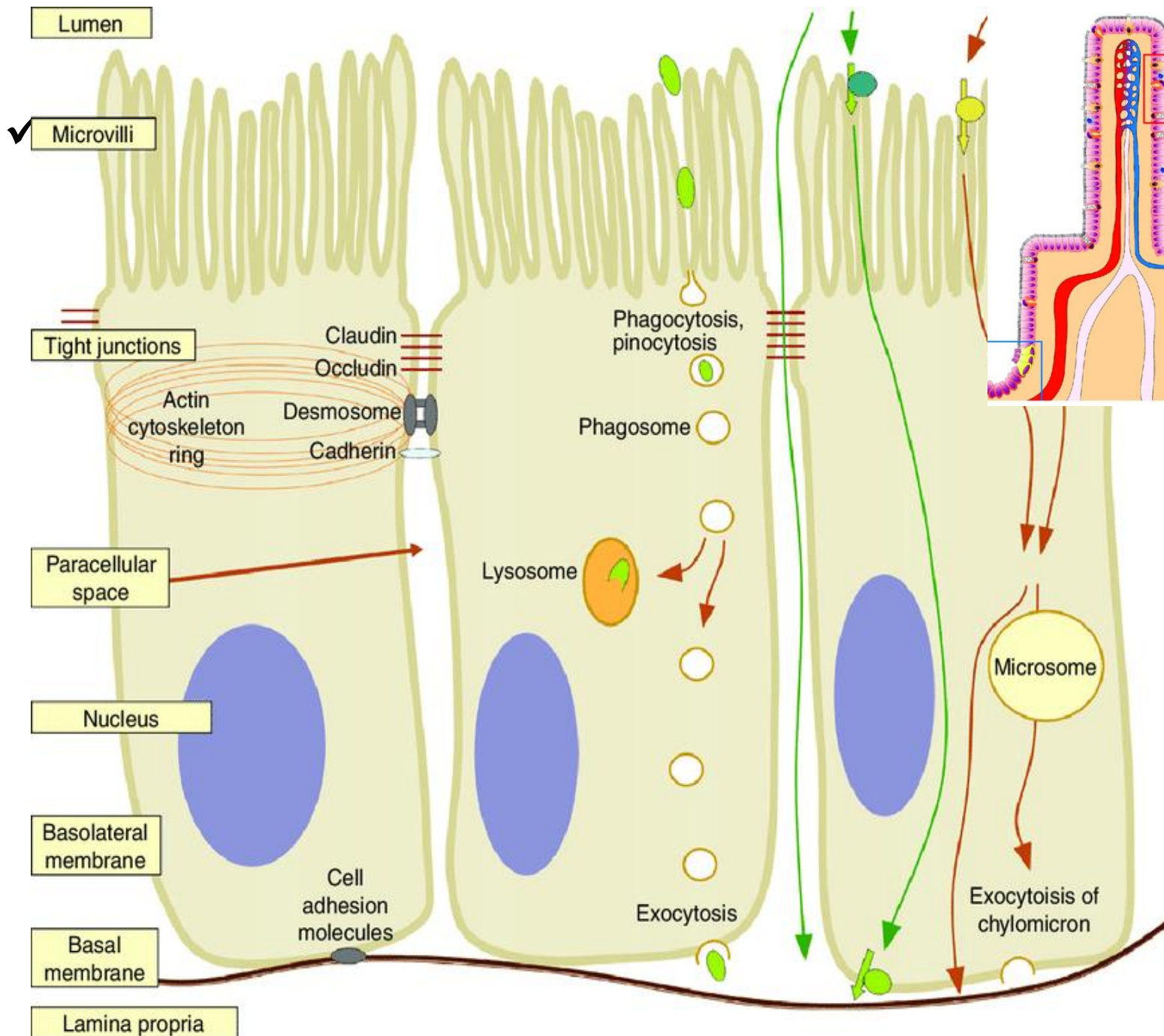


Increase the Mucosal
Absorptive Area by
Nearly **1000-Fold**.

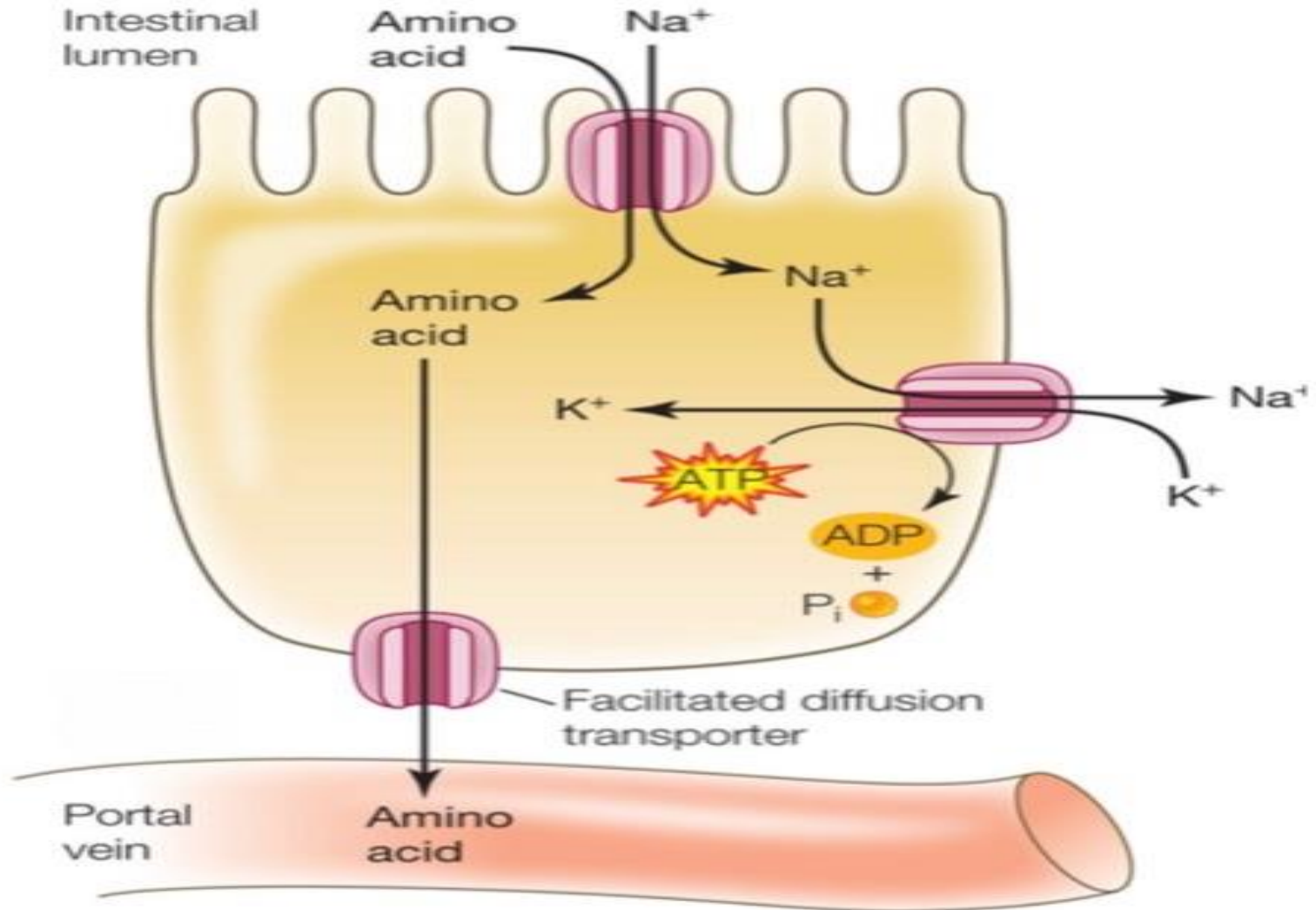
a brush border

- The presence of villi on the mucosal surface enhances the total absorptive area another 10-fold.
- **Finally, each intestinal epithelial cell on each villus is characterized by a brush border, consisting of as many as 1000 microvilli that protrude into the intestinal chyme.**



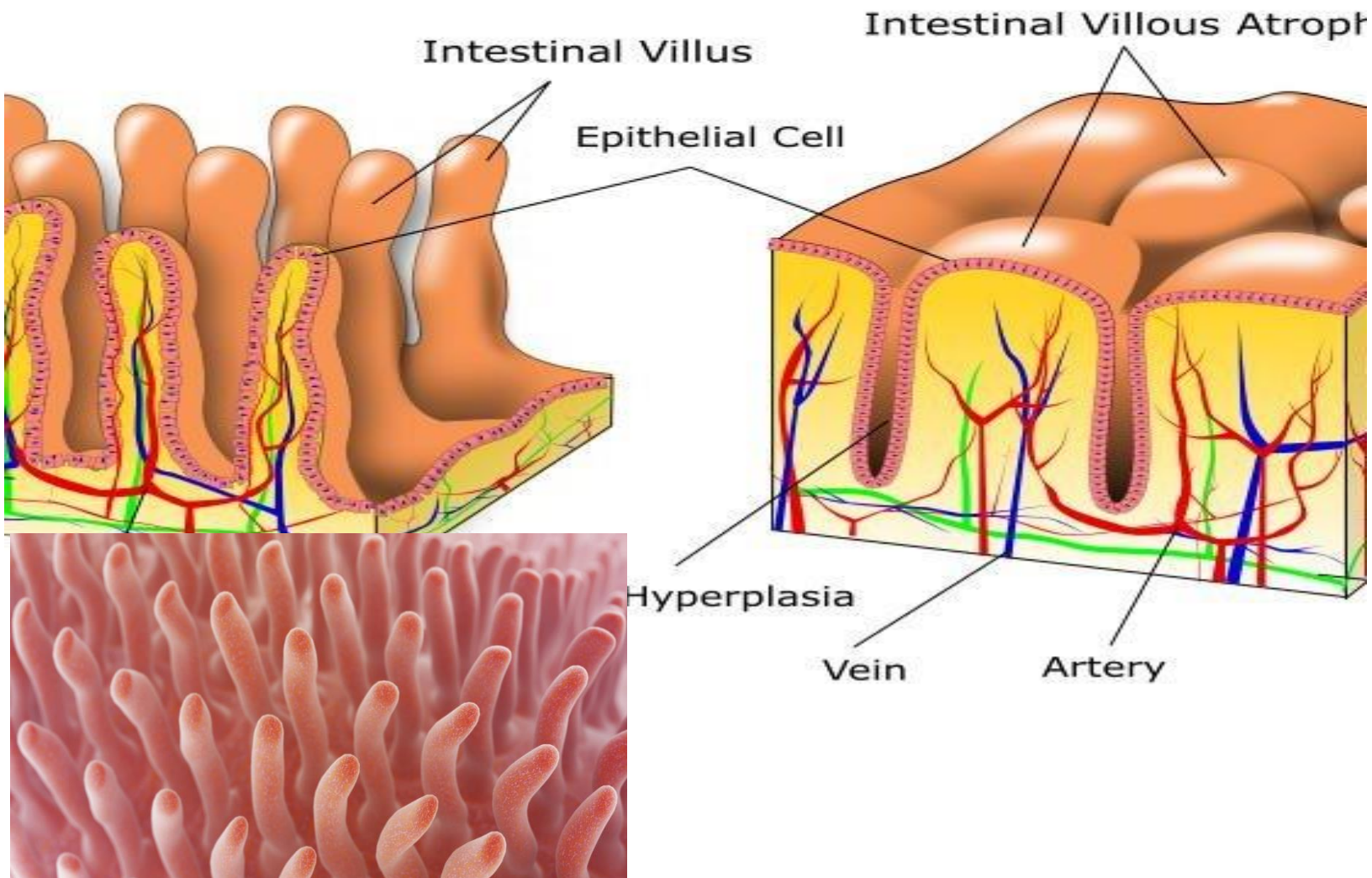


Question 2. The image below depicts the transport mechanism for intestinal cells to absorb amino acids from the lumen and transport them to the portal vein.



✓ Normal

Celiac Disease



Absorption of small intestine / ABSORPTION OF IONS

- ❑ Sodium Is **Actively Transported** Through the Intestinal Membrane.
- ❑ Na important Sodium also plays an important role in helping to absorb sugars and amino acids
- ❑ Aldosterone Greatly Enhances Sodium Absorption.
- ❑ Absorption of Chloride Ions in the Small Intestine. Follow the Na by diffusion

The **toxins of cholera** and of some other types of diarrheal bacteria can stimulate the epithelial fold secretion so greatly that this secretion often becomes much greater than can be reabsorbed, thus sometimes causing a loss of 5 to 10 liters of water and sodium chloride as diarrhea each day. Within 1 to 5 days, many severely affected patients die of this loss of fluid alone.

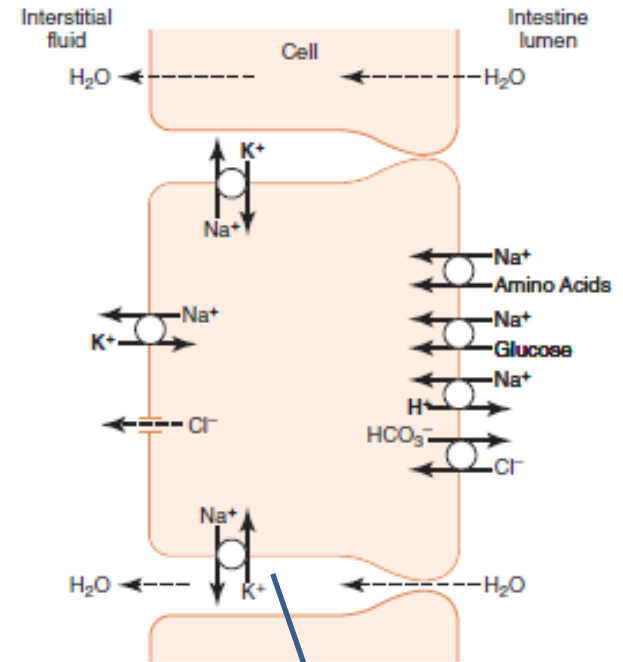


Figure 66-8. Absorption of sodium, chloride, glucose, and amino acids through the intestinal epithelium. Note also osmotic absorption of water (i.e., water "follows" sodium through the epithelial membrane).

**Active transport
(ATPase)**

Sodium is also co-transported through the brush border membrane by several specific carrier proteins, including

- (1) The sodium-glucose co-transporter,**
- (2) sodium-amino acid co-transporters,**
- and (3) the sodium-hydrogen exchanger**

Absorption of Bicarbonate Ions in the Duodenum and Jejunum.

- ❖ large quantities of bicarbonate ions must be reabsorbed from the upper small intestine because large amounts of bicarbonate ions have been secreted into the duodenum in both pancreatic secretion and bile.
- **Secretion of Bicarbonate and Absorption of Chloride Ions in the Ileum (small intestine) and Large Intestine.**
- ❖ The epithelial cells on the surfaces of the villi in the ileum, as well as on all surfaces of the large intestine, have a **special capability of secreting bicarbonate ions** in exchange for absorption of chloride ions. This capability **is important** because it provides alkaline bicarbonate ions that **neutralize acid products formed by bacteria** in the large intestine.

ABSORPTION OF IONS

- ❑ Active Absorption of Calcium, Iron, Potassium, Magnesium, and Phosphate. *in deudenum* , *Need parathyroid hormone and vit D*
- ❑ *Iron ions* are also actively absorbed from the small intestine.
- ❑ The principles of iron absorption and regulation of its absorption **in proportion to the body's need for iron**, especially for the formation of hemoglobin

ABSORPTION OF NUTRIENTS

★ 1. Carbohydrates Are Mainly Absorbed as Monosaccharides
Glucose Is Transported by a Sodium Co-Transport Mechanism but fructose be different in mechanism

2-Absorption of Proteins as Dipeptides, Tripeptides, or Amino Acids

3-Absorption of Fats bile micelles (ferrying)★
97% of fat absorbed but in absence of bile micelles only 40 % absorbed



ABSORPTION IN THE LARGE INTESTINE: FORMATION OF FECES

Most of the absorption in the large intestine occurs in the proximal one half of the colon, giving this portion the name *absorbing colon*, whereas the distal colon functions principally for feces storage until a propitious time for feces excretion and is therefore called the *storage colon*.

1500 milliliters of chyme normally pass through the ileocecal valve into the large intestine each day only 100 ml excreted in feces also, essentially all the ions are absorbed

Extreme Secretion of Chloride Ions, Sodium Ions, andm Water from the Large Intestine Epithelium in Some Types may be lethal diarrhea of Diarrhea. Like in cholera

Thank You



TEA
& Iron
Deficiency

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