Absorption Of Amino Acids

Amino acids are absorbed by intestinal epithelial cells and released into the blood. It is an energy requiring process. The di- and tripeptidases, after being absorbed are hydrolyzed into free amino acids in the cytosol of epithilial cells.

There are 5 different carriers for amino acids

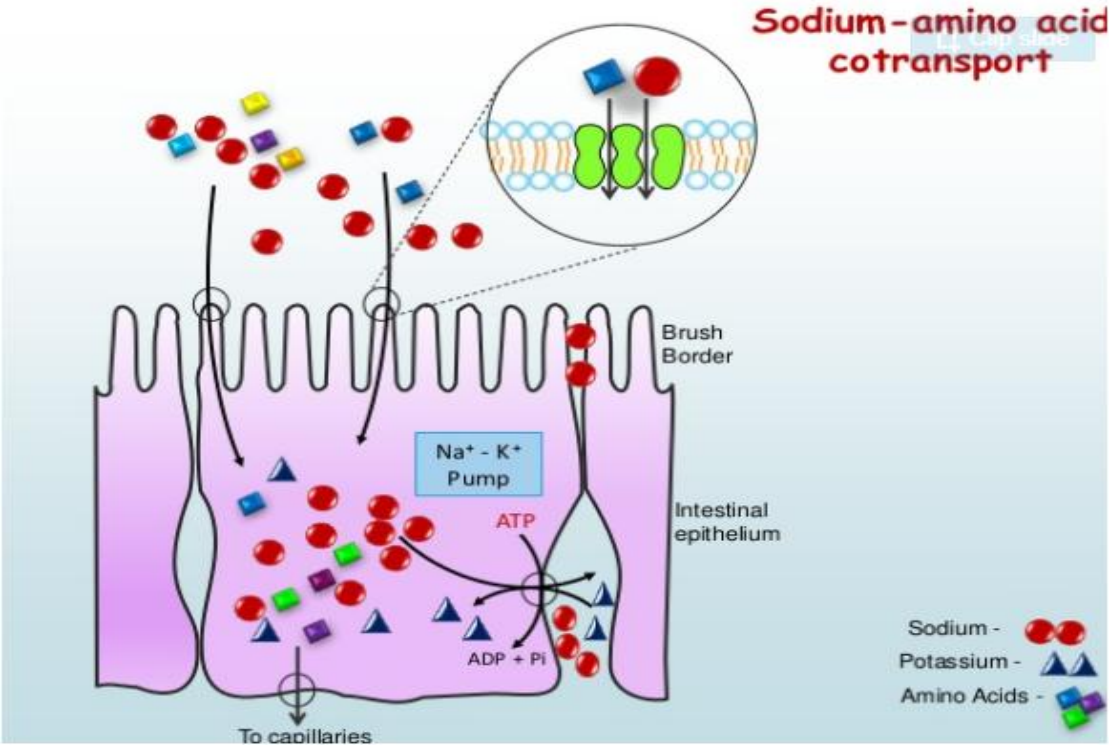
- Transporter for acidic amino acids
- Transporter for basic amino acids
- Transporter for neutral amino acids
- Transporter for imino acid
- Transporter for β- amino acids

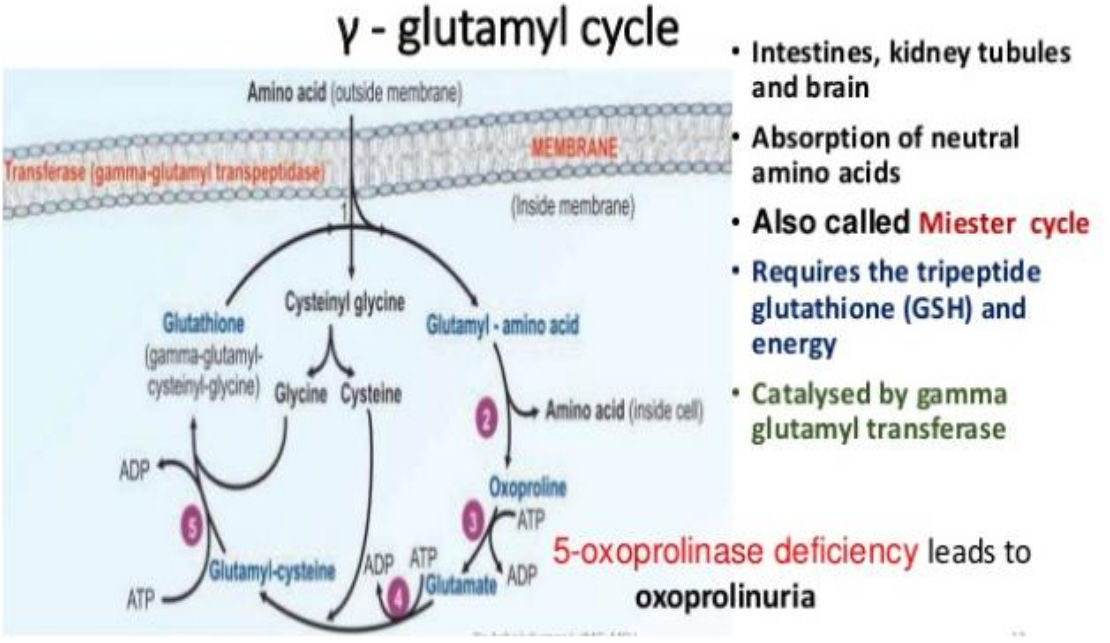
Transport System	Amino acids Transported	Disorder Associated
• Small neutral amino acids	• Alanine, Serine & Threonine	• Hartnup disease
• Large neutral amino acids	• Isoleucine, Leucine, Valine, Tyrosine, tryptophane, PA	
• Basic amino acids	• Arg, Lys, Ornithine & Cystine	• Cystinuria
• Acidic amino acids	• Glu acid & Asp acid	
• imino acid and Glycine	• Proline, OH-proline & Glycine	• Glycinuria

Mechanism of Amino Acids Absorption

There are three mechanisms of amino acids absorption.

1. Sodium independent facilitated transport system .
2. Sodium dependent secondary active transport system.
2. Glutathione Transport System (Glutamyl Cycle).





Absorption of intact proteins & polypeptides

- Short period, immediately after birth, the small intestine of infants can absorb intact proteins and polypeptide by endocytosis or pinocytosis

- Intact proteins and polypeptides are not absorbed by the adult intestine
- Macromolecular absorption in certain individuals appears to be responsible for antibody formation that often causes food allergy.

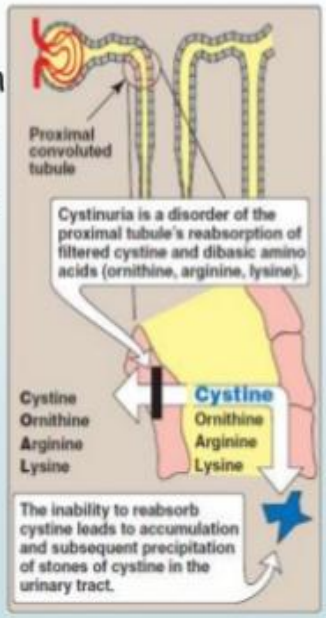
Acute pancreatitis: Premature activation of trypsinogen inside the pancreas itself will result in the autodigestion of pancreatic cells

Defects in the intestinal amino acid transport systems are seen in inborn errors of metabolism

- Hartnup's disease
- Cystinuria : [dibasic amino acids, ornithine, arginine, and lysine (represented as "COAL")
- Imino glycinuria
- Lysinuric protein intoletence
- Oasthouse syndrome

CLINICAL SIGNIFICANCE

Cystinuria- Common transporter for cystine, ornithine, arginine and lysine(COAL) is present in gut and renal tubules. Deficiency of transporter results in loss of these amino acids in the feces and urine.



Hartnup's Disease- There is deficiency of transporter for tryptophan and neutral amino acid. no absorption of tryptophan takes place ,tryptophan deficiency produce neurological and skin manifestation (pellagra-like rashes).