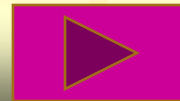
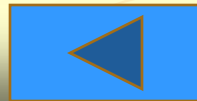


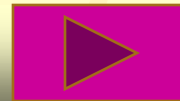
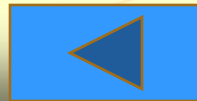
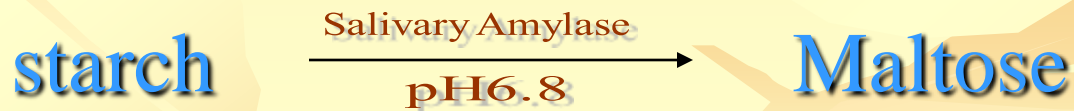
# Digestion of Food

The process of digestion is accomplished by mechanical & chemical processes:-

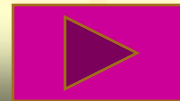
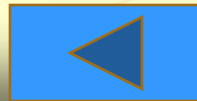
- The buccal cavity performs two major functions, mastication of food & facilitation of swallowing.
- The teeth & the tongue with the help of saliva masticate & mix-up the food thoroughly.
- Mucus in saliva helps in lubricating & adhering the masticated food particles into a BOLUS.
- The bolus is then conveyed into the pharynx & then into the oesophagus by swallowing or DEGLUTITION.



- The bolus further passes down through the oesophagus by successive waves of muscular contraction called PERISTALSIS.
- The saliva secreted into the oral cavity contains electrolytes ( $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Cl}^-$ ,  $\text{HCO}^-$ ) and enzymes, salivary amylase & lysozyme. The chemical process of digestion is initiated in the oral cavity by the hydrolytic action of the carbohydrate splitting enzyme, the salivary amylase.

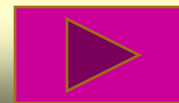


- The mucosa of stomach has gastric glands.
- The stomach stores the food for 4-5 hours.
- The food mixes thoroughly with the acidic gastric juice of the stomach by the churning movements of its muscular wall & is called the CHYME.
- The proenzyme pepsinogen on exposure to hydrochloric acid gets converted into the active enzymes pepsin.
- Pepsin converts proteins into proteoses & peptones (peptides).

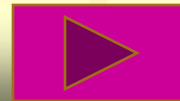
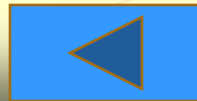




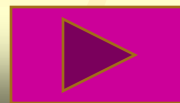
- The mucus & bicarbonates present in the gastric juice play an important role in lubrication & protection of the mucosal epithelium from excoriation by the highly concentrated hydrochloric acid.
- HCL provides the acidic pH (pH 1.8) optimal for pepsins.
- Rennin is a enzyme found in gastric juice of infants which helps in the digestion of milk proteins. Small amounts of lipases are also secreted by gastric glands.
- The bile, pancreatic juice & the intestinal juice are the secretions released into the small intestine.



- Pancreatic juice & the bile are released through the hepato-pancreatic duct.
- The pancreatic juice contains inactive enzymes- trypsinogen, chymotrypsinogen, procarboxypeptidases, amylases, lipases & nucleases.
- Trypsinogen is activated by an enzyme, enterokinase, secreted by the intestinal mucosa into active trypsin.
- The bile released into the duodenum contains bile pigments ( bilirubin & bili-verdin), bile salts, cholesterol & phospholids but no enzymes.
- It helps in emulsification of fats and activates lipases.

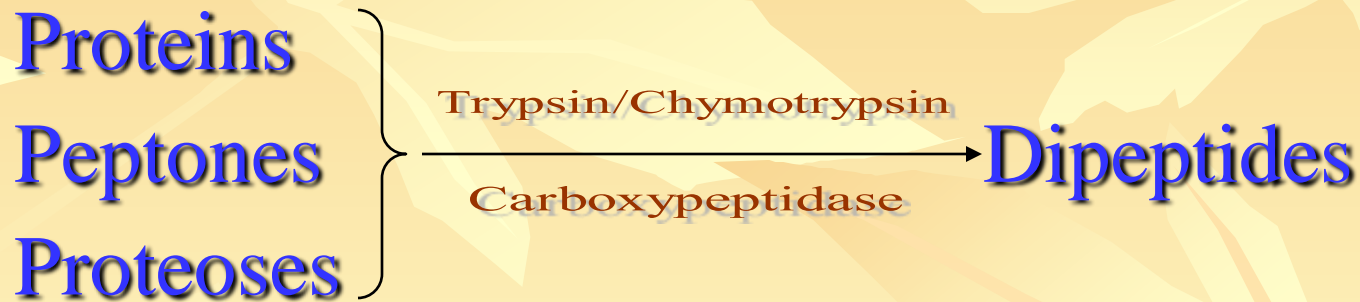


- The intestinal mucosal epithelium has **GOBLET CELLS** which secrete mucus. The secretions of the brush border cells of the mucosa along with the secretions of the goblet cells constitute the intestinal juice or **SUCCUS ENTERICUS**. This juice contains a variety of enzymes like disaccharidases (e.g., maltase), dipeptidases, lipases, nucleosidases, etc.
- The mucus along with the bicarbonates from the pancreas protects the intestinal mucosa from acid as well as provide an alkaline medium (pH7.8) for enzymatic activities.

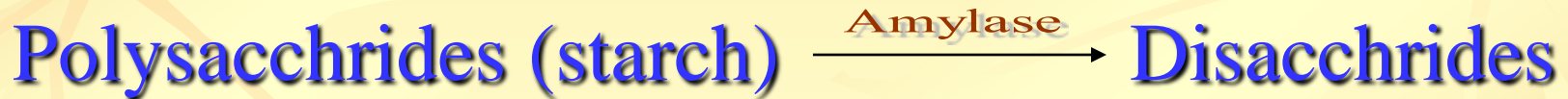




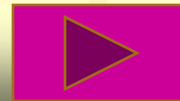
- Proteins, proteoses & peptones in the chyme reaching the intestine are acted upon by the proteolytic enzymes of pancreatic juice



- Carbohydrates in the chyme are hydrolysed by pancreatic amylase into disacchrides



- Fats are broken down by lipases with the help of bile into di-and monoglycerides.



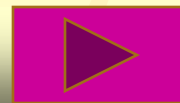
Fats  $\xrightarrow{\text{Lipases}}$  Diglycerides  $\longrightarrow$  Monoglycerides

- Nucleases in the pancreatic juice acts on nucleic acids to form nucleotides and nucleosides

Nucleic acids  $\xrightarrow{\text{Nucleases}}$  Nucleotides  $\longrightarrow$  Nucleosides

- The enzymes in the succus entericus act on the end products to form the respective simple absorbable forms.
- These final steps in digestion occur very close to the mucosal epithelial cells of the intestine.

Dipeptides  $\xrightarrow{\text{Dipeptidases}}$  Amino acids





Maltose  $\xrightarrow{\text{Maltase}}$  Glucose + Glucose

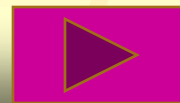
Lactose  $\xrightarrow{\text{Lactase}}$  Glucose + Galactose

Sucrose  $\xrightarrow{\text{Sucrase}}$  Glucose + Fructose

Nucleotides  $\xrightarrow{\text{Nucleotidases}}$  Nucleosides  $\xrightarrow{\text{Nucleotidases}}$  Sugars  
+ Bases

Di & Monoglycerides  $\xrightarrow{\text{Lipases}}$  Fatty acids + Glycerol

The breakdown of biomacromolecules (mentioned above) occurs in the Duodenum region of the small intestine. The simple substances thus formed are absorbed in the jejunum & ileum.



No significant digestive activity occurs in the **LARGE INTESTINE** but it has some functions:-

- Absorption of water, minerals & some drugs.
- Secretion of mucus which helps in adhering the waste.

The undigested , unabsorbed substances called faeces enters into the caecum of large intestine through ileo-caecal valve which prevents the back flow of he faecal matter, It is temporarily stored in the rectum till defaecation.

