DIGESTIVE ENZYME

*Digestive enzymes are a group of enzymes that breakdown polymeric macromolecules into their smaller building blocks, in order facilitate their absorption by the body.

*Digestive enzymes are found in the digestive tracts of animals (including humans) and in the tract of carnivorous plants.

*Digestive enzymes are classified based on their target substrates:

*Lipases split fatty acids off of fats and oils.

*Proteases and peptidases split proteins into small peptides and amino acids.

*Amylases split carbohydrates such as starch, sugars into simple sugars such as glucose.

*Nucleases split nucleic acids into nucleotides

Mouth:

Lingual lipase: Lipid digestion initiates in the mouth. Lingual lipase starts the digestion of the lipids/fats.

Salivary amylase: Carbohydrate digestion also initiates in the mouth. Amylase, produced by the salivary glands, breaks complex carbohydrates, mainly cooked starch, to smaller chains, or even simple sugars. It is sometimes referred to as ptyalin.

Stomach

The enzymes that are secreted in the stomach are gastric enzymes.

Pepsin is the main gastric enzyme. It is produced by the stomach cells called "chief cells" in its inactive form pepsinogen which is a zymogen.

Pepsinogen is then activated by the stomach acid into its active form, pepsin. Pepsin breaks down the protein in the food into smaller particles, such as peptide fragments and amino acids.

Gastric Lipase: Gastric lipase is an acidic lipase secreted by the gastric chief cells in the fundic mucosa in the stomach. It has a pH optimum of 3-6.

Gastrin: The important hormone produced by the "G-cells" of the stomach.

Pancreas

Pancreatic juice, composed of the secretions of both ductal and acinar cells, contains the following digestive enzymes

Trypsinogen which is an inactive protease that, once activated in the duodenum into trypsin, breaks down proteins at the basic amino acids. Trypsinogen is activated via the duodenal enzyme enterokinase into its active

form trypsin.

*Chymotrypsinogen which is an inactive protease that, once activated by duodenal enterokinase turns into chymotrypsin and breaks down proteins at their aromatic amino acids. Chymotrypsinogen can also be activated by trypsin.

*Carboxypeptidase, which is a protease that takes off the terminal amino acid group from a protein.

*Several elastases that degrade the protein elastin and some other proteins.

*Pancreatic lipase that degrades triglycerides into two fatty acids and a monoglyceride.

*Sterol esterase

*Phospholipase

*Several nucleases that degrade nucleic acids like DNA ase and RNA ase

*Pancreatic amylase that breaks down starch and glycogen which are alpha linked glucose polymers.