

CHAPTER 11

DIGESTION

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Digestion is a process in which large, complex, insoluble and non-diffusible substances are converted into small, simple, soluble and diffusible substances to get energy.

OR

Digestion is the process by which food and drink are broken down into their smallest parts so the body can use them to build and nourish cells and provide energy.

EXPLANATION

When we eat food - such as bread, meat and vegetables - they are not in a form that the body can use for nourishment. Food and drink must be changed into smaller molecules of nutrients before they can be absorbed into the blood and carried to cells throughout the body.

DIGESTION MECHANISM

Digestion involves mixing food with digestive juices, moving it through the digestive tract, and breaking down large molecules of food into smaller molecules.

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Digestion begins in the mouth, when we chew and swallow, and is completed in the large intestine.

DIGESTIVE SYSTEM

The digestive system is made up of the digestive tract - a series of hollow organs joined in a long, twisting tube from the mouth to the anus - and other organs that help the body break down and absorb food.

There are also two solid digestive organs, the liver and the pancreas, which produce juices that reach the intestine through small tubes. In addition, parts of other organ systems (for instance, nerves and blood) play a major role in the digestive system.

DIGESTIVE PROCESSES

Human body have well developed digestive system that can conduct the following processes:

1. INGESTION

The intake of food is called ingestion.

2. MASTICATION

The chewing of food with the help of saliva is called mastication.

3. SWALLOWING

The engulfing of food bolus from buccal cavity is swallowing.

4. DIGESTION

The breakdown of large, complex and non-diffusible organic compounds of food into small, simple and diffusible molecules by the action of enzymes is digestion.

5. ABSORPTION

The uptake of digested food particles from digestive tract into blood vessels is called absorption.

6. ASSIMILATION

The utilization of digested ^{absorbed} ~~food~~ and ^{food} particles ~~from~~ materials for the production of energy and synthesis of cellular metabolites is called assimilation.

[When food becomes part of protoplasm]

7. EGESTION

Elimination or removal of undigested food particles from body is called egestion.

TYPES OF DIGESTION

There are two types of digestion:

1. Mechanical Digestion
2. Biochemical or chemical Digestion

1. MECHANICAL / PHYSICAL DIGESTION

A type of digestion in which food is physically broken down without involvement of enzymes is called mechanical digestion e.g. mastication (grinding) of food in mouth.

2. BIOCHEMICAL OR CHEMICAL DIGESTION

A type of digestion in which food is digested with the help of certain chemicals (enzymes) is called biochemical digestion e.g. carbohydrates are digested by carbohydrases. This digestion is further divided into two types:

i) INTRACELLULAR DIGESTION

A type of digestion in which food is digested within the cell e.g. digestion in amoeba.

ii) INTERCELLULAR DIGESTION

A type of digestion in which food is digested between the cells e.g. digestion in human.

HUMAN DIGESTIVE SYSTEM OR GASTROINTESTINAL TRACT (GIT) OR ALIMENTARY CANAL

Human has well developed, complete, efficient and complex digestive system which extends from mouth to anus.

LENGTH

In adult man gastrointestinal tract is about 7.7-9m in length.

PARTS

1. Mouth and buccal cavity
2. Pharynx
3. Esophagus
4. Stomach
5. Small intestine (Duodenum, Jejunum, Ileum)
6. Large intestine (Coecum, Colon, Rectum)
7. Digestive glands such as salivary glands, pancreas and liver.

BASIC ANATOMY OF GASTRO-INTESTINAL TRACT

The general cross-section of the gastrointestinal tract or gut is basically the same from the esophagus to the end of colon (anus).

SEROSA

The outermost layer is serosa.

SMOOTH MUSCLES

Beneath the serosa are smooth muscles in longitudinal and circular form.

SUB-MUCOSA AND MUCOSA

Next to the smooth muscles ~~are~~ is sub-mucosa which lies or thin layer of muscles and interior most layer is mucosa which face the lumen or gut cavity. However, the folding of mucosa varies from region to region (e.g less in the esophagus, much more in the ileum)

The sub-mucosa contains nerves, blood and lymph vessels, collagen and elastic fibres. The nerves regulate the gut movements by muscle contractions to force the food along or to mix the food with secretions in a particular region and the digestive secretions into the lumen of the gut.

GLANDS

There are different glands in gut varying origin and location wise e.g salivary glands in the mouth, goblet cells in gut, gastric glands in stomach, duodenal glands, intestinal glands are digestive glands while liver and pancreas are accessory glands to digestive system, being connected via ducts to the duodenum.