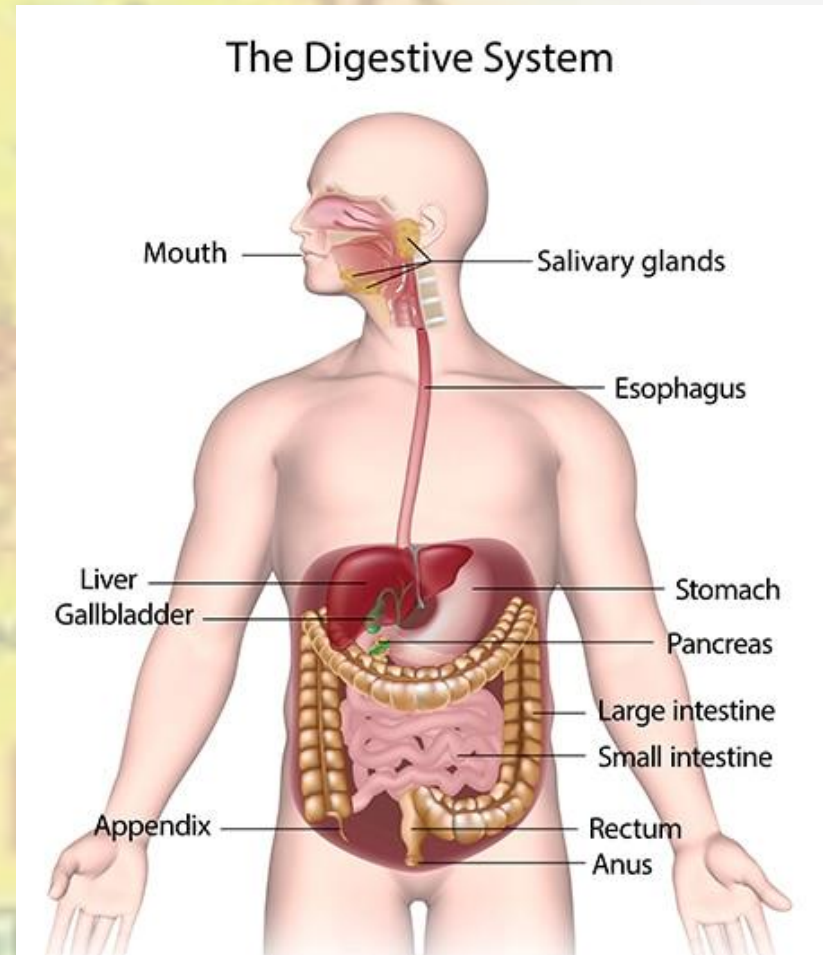


HUMAN DIGESTIVE SYSTEM

- Nutrition
- Every living cell require energy
- Modes of nutrion
- Autotrophic and Heterotrophic



PHOTOSYNTHESIS

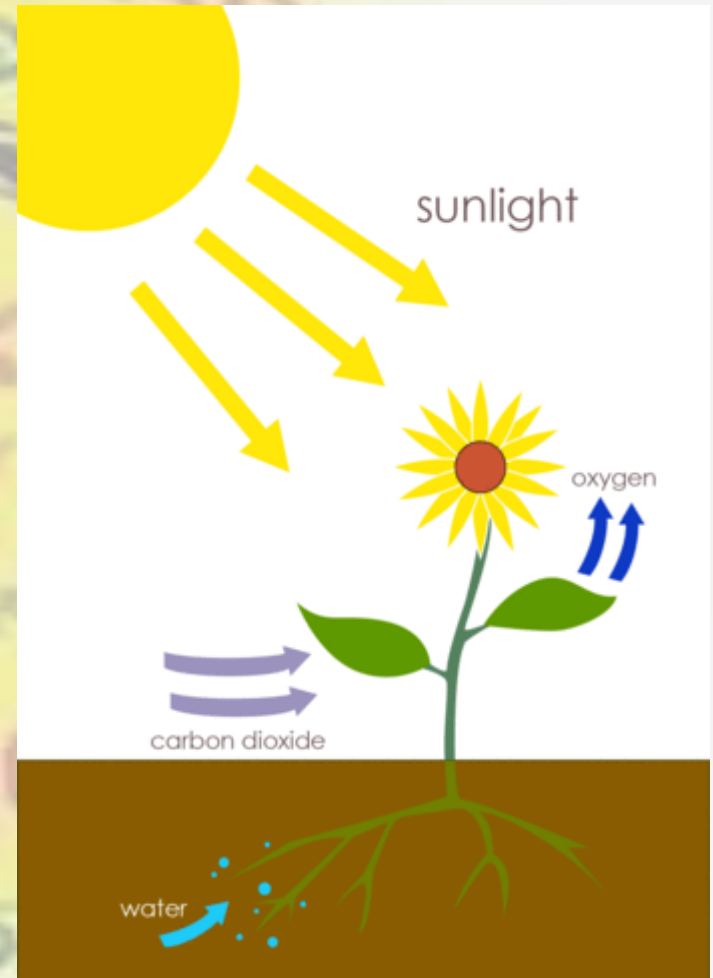
Definition of Photosynthesis:

- The process by which green plants, algae, and some bacteria convert light energy into chemical energy in the form of glucose, using carbon dioxide and water as raw materials.

Location of Photosynthesis:

- In plants, photosynthesis primarily occurs in the chloroplasts, specifically in the chlorophyll-containing thylakoid membranes.

Chemical Equation of Photosynthesis:



Ingestion:

- The first step is the intake of food. Animals consume food through various methods, such as biting, chewing, or engulfing.

Mechanical Digestion:

- Mechanical digestion involves the physical breakdown of food into smaller particles. This process begins in the mouth through chewing and mixing with saliva. The teeth help in breaking down large food particles into smaller pieces, increasing the surface area for subsequent chemical digestion.

Chemical Digestion in the Mouth:

- Salivary glands release saliva into the mouth, which contains enzymes like amylase. Amylase begins the breakdown of complex carbohydrates (starches) into simpler sugars.

Swallowing:

- After mechanical and initial chemical digestion in the mouth, the food is formed into a bolus and swallowed. It moves down the esophagus through a process called peristalsis.

HUMAN TEETH

Incisors:

- Incisors are the front teeth and are used for cutting and chopping food.
- There are four incisors in each quadrant, two on the top and two on the bottom.

Canines:

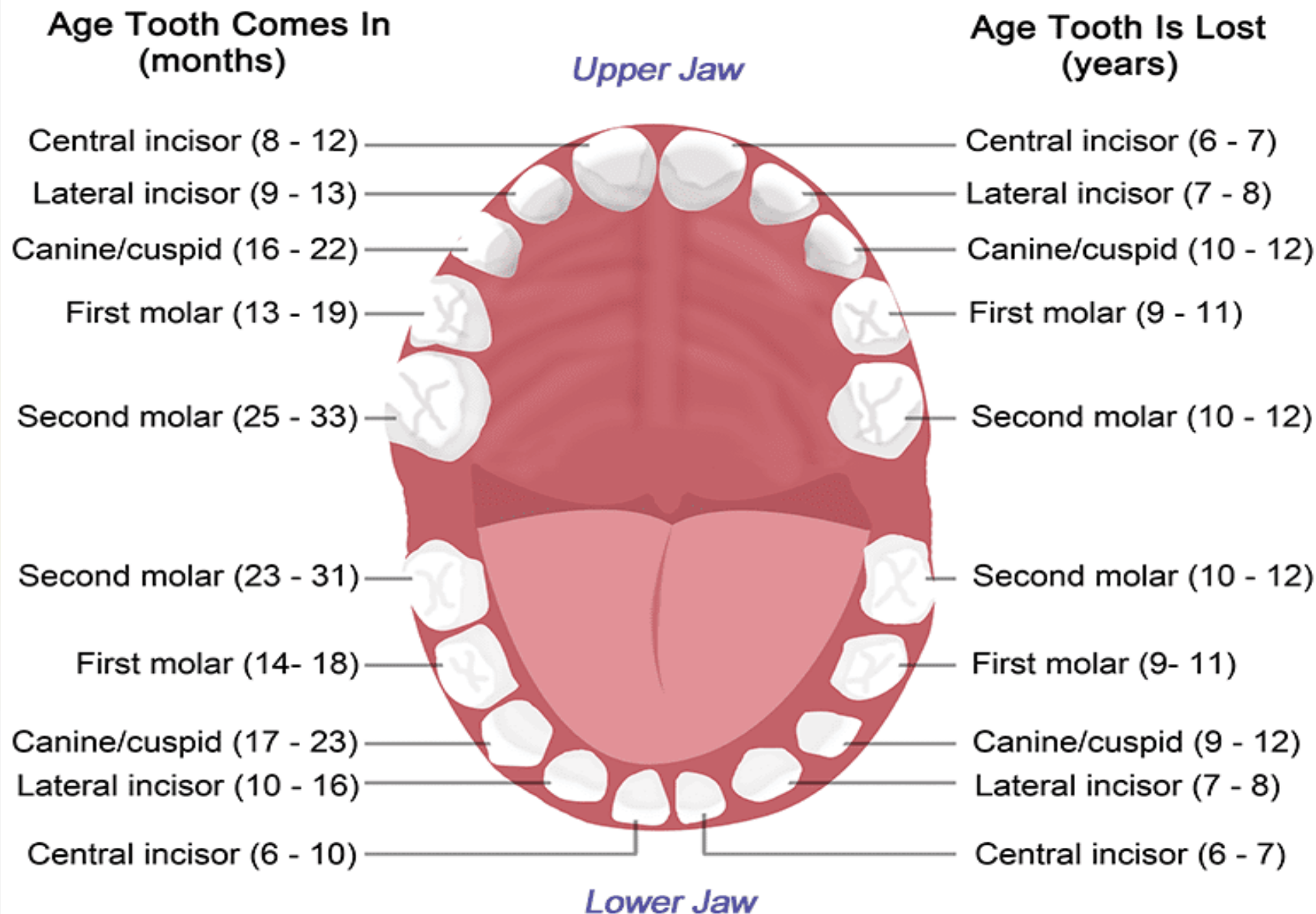
- Canines are pointed teeth next to the incisors.
- They are designed for tearing and gripping food.
- There are two canines in each quadrant.

Premolars:

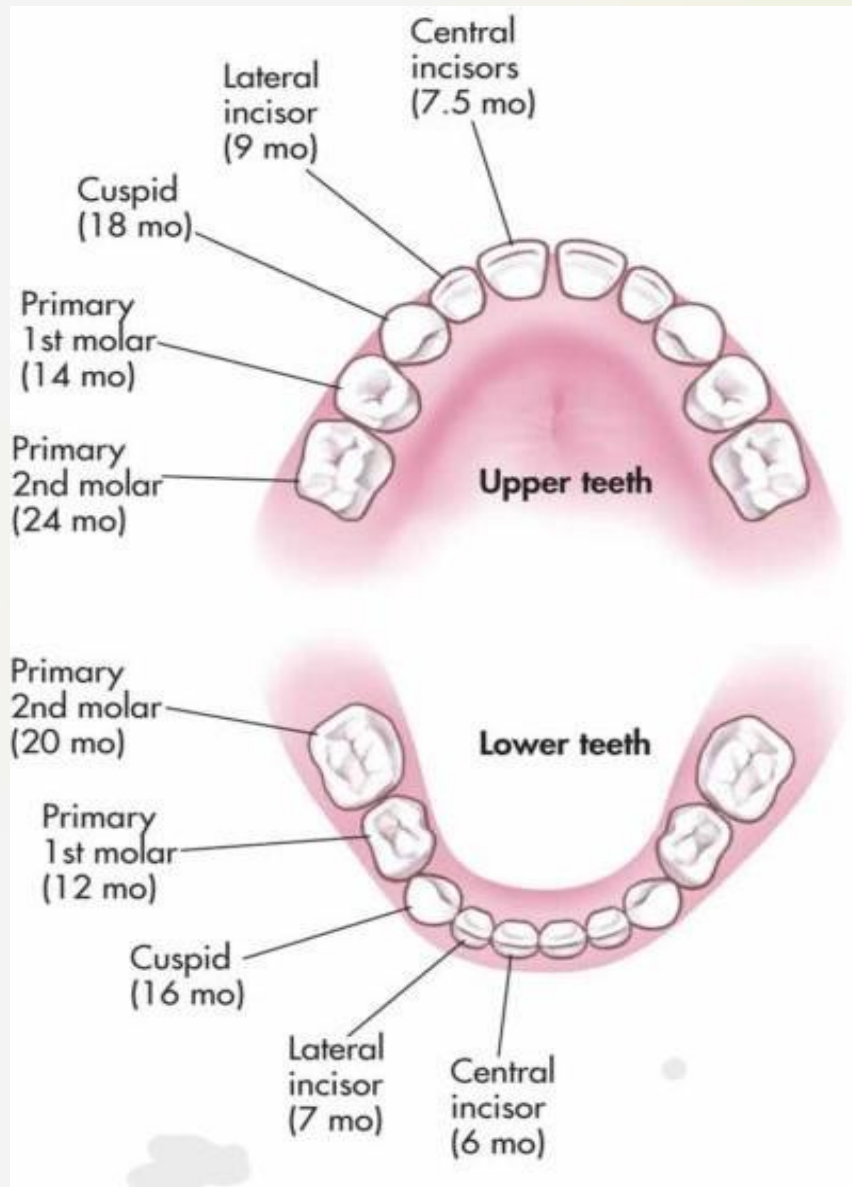
- Premolars are located behind the canines and have flat surfaces.
- They assist in grinding and crushing food.
- There are two premolars in each quadrant.

Molars:

- Molars are the large, flat teeth at the back of the mouth.
- They are specialized for grinding and crushing food.
- There are three molars in each quadrant.



- The dental formula for the permanent (adult) dentition in humans is as follows:
- **2-1-2-3 / 2-1-2-3**
- This formula indicates the number of each type of tooth in one half of the mouth:
- **Incisors (I):** 2 central incisors, 1 on each side; 2 lateral incisors, 1 on each side.
- **Canines (C):** 2 canines, 1 on each side.
- **Premolars (P):** 2 first premolars, 1 on each side; 2 second premolars, 1 on each side.
- **Molars (M):** 3 first molars, 1 on each side; 2 second molars, 1 on each side; 3 third molars (wisdom teeth), 1 on each side.



Deciduous (Baby) Teeth:

- Children start with a set of 20 deciduous teeth, also known as baby teeth.
- These teeth are gradually replaced by permanent teeth.

Tooth Enamel:

- Enamel is the outermost layer of the tooth, and it is the hardest substance in the human body.
- It provides protection to the tooth from wear and tear.

- **Stomach Digestion:**

- In the stomach, gastric glands secrete gastric juice, which contains hydrochloric acid and digestive enzymes such as pepsin. This acidic environment helps in the breakdown of proteins into smaller peptides and amino acids. The primary function of gastric mucus is to protect the stomach lining from the corrosive effects of stomach acid (hydrochloric acid) and digestive enzymes, such as pepsin.

- **Churning in the Stomach:**

- The stomach contracts and relaxes, churning the partially digested food and mixing it with gastric juices. This process further breaks down food into a semi-liquid mixture called chyme.

- **Small Intestine:**

- Most digestion and nutrient absorption occur in the small intestine. The pancreas secretes digestive enzymes into the small intestine to break down carbohydrates, proteins, and fats into simpler forms.

- **Entry of Chyme:**

- Chyme, the semi-liquid mixture of partially digested food and stomach acids, enters the small intestine from the stomach.

- **Role of Pancreatic Juice:**

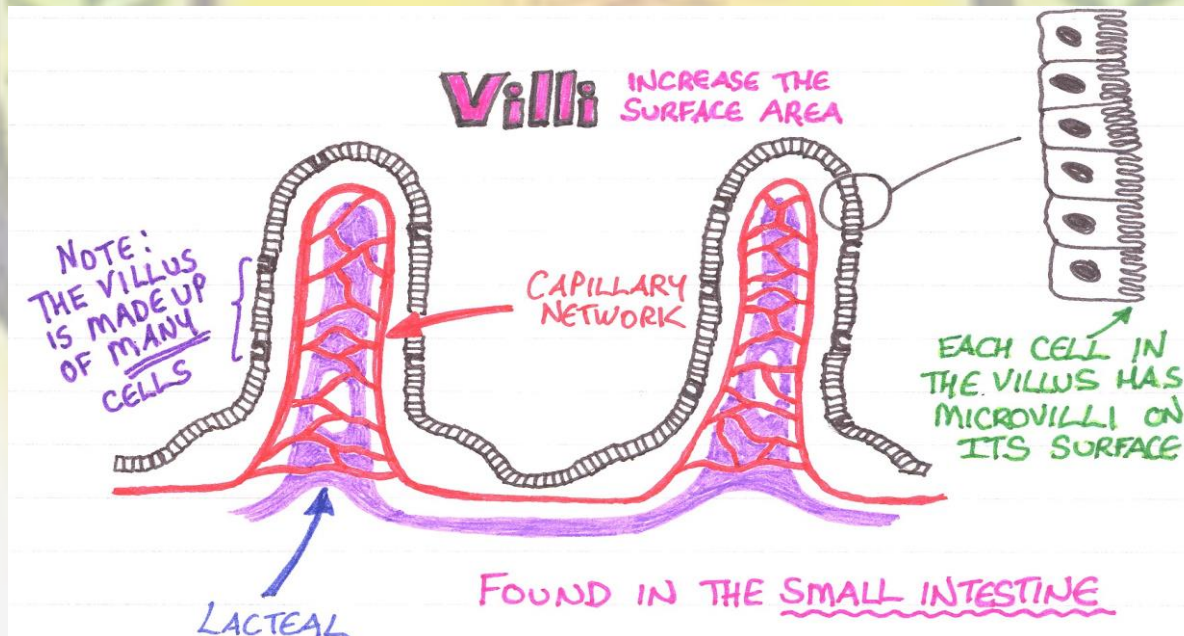
- The pancreas secretes pancreatic juice into the small intestine. This juice contains enzymes such as amylase (for carbohydrates), lipase (for fats), and proteases (for proteins).

- **Bile Secretion:**

- The liver produces bile, which is stored in the gallbladder and released into the small intestine. Bile emulsifies fats, breaking them down into smaller droplets and aiding in their digestion by lipases.

- **Absorption:**

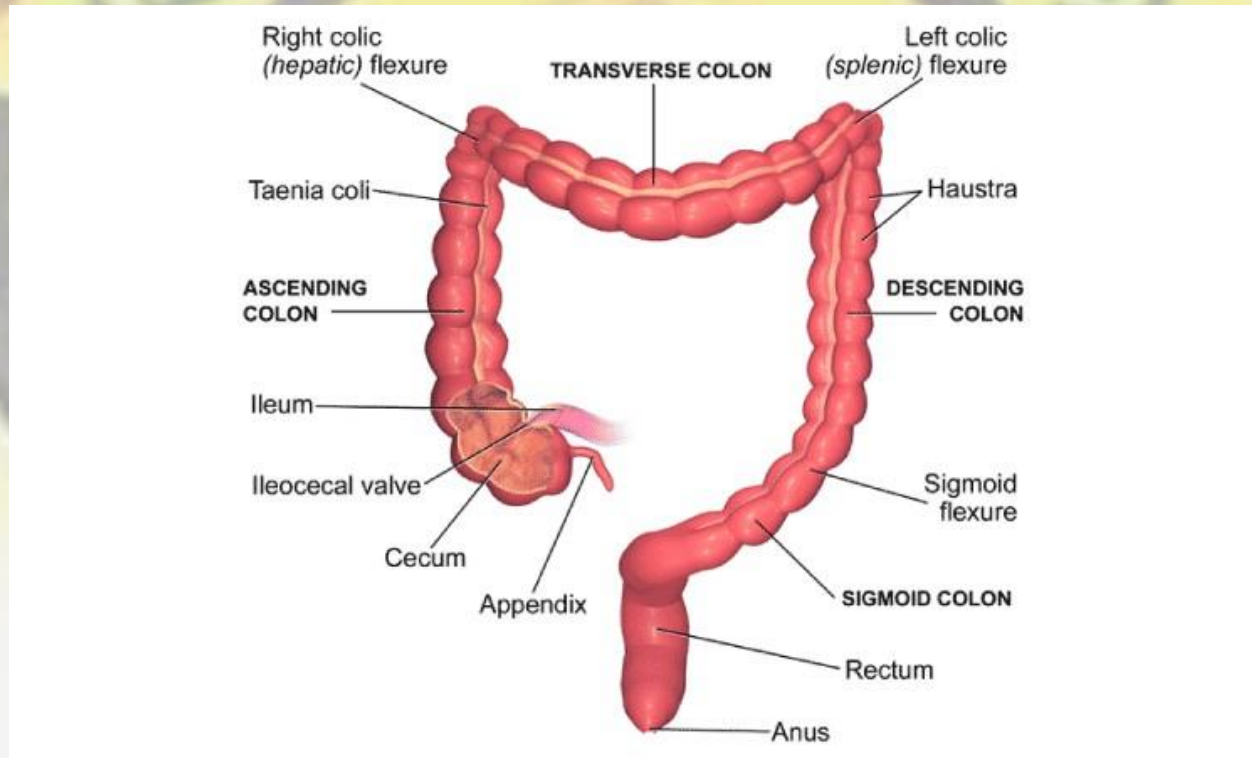
- The walls of the small intestine are lined with tiny finger-like projections called villi and microvilli, which significantly increase the surface area for nutrient absorption. Nutrients, such as amino acids, fatty acids, glucose, and minerals, are absorbed into the bloodstream through the walls of the small intestine.



- **Final Stages of Carbohydrate Digestion:**
 - Enzymes in the small intestine, including maltase, sucrase, and lactase, break down complex carbohydrates into simple sugars (e.g., glucose).
- **Protein Digestion:**
 - Proteins are broken down into amino acids by protease enzymes, such as trypsin and chymotrypsin from the pancreas.
- **Fat Digestion:**
 - Lipase enzymes break down fats into fatty acids and glycerol, making them more accessible for absorption.

- **Large Intestine (Colon):**

- The remaining indigestible material, mainly water and undigested food particles, moves into the large intestine. Water is reabsorbed, and the remaining material is formed into feces.



- **Formation and Elimination of Feces:**

- Feces, consisting of water, undigested food, bacteria, and cells shed from the lining of the intestines, are formed in the colon. The rectum stores faeces until it is eliminated through the anus in the process of defecation.

