

Unit 8: Biodiversity

Content Outline: Digestive Systems (8.12)

I. Food

- A. It is the *source of chemical energy* used to create ATP (molecule of cellular work) in the process of cellular respiration.
- B. It can also serve as the *raw building materials* for “making” the organism.

II. **Undernourishment** - This condition is caused by a lack of food.

III. **Overnourishment** - This condition is caused by too much food in the diet.

- A. Condition can cause Obesity and heart problems.

IV. **Malnourished** - This condition is caused by eating poor quality food.

V. Feeding Types:

- A. **Herbivore** – These are plant eaters.
- B. **Carnivores** – These are meat eaters.
- C. **Omnivores** – These are plant and meat eaters. (“omni” means “all”)

VI. Feeding Mechanisms:

- A. **Suspension/filter feeding** (whales, sponges, bivalves)
- B. **Substrate feeding** (maggots) (Substrate refers to “surfaces”. They live in or on their food source.)
- C. **Deposit feeders** (earthworms) (They eat substances deposited in the soil.)
- D. **Fluid feeders** (mosquitoes, hummingbirds) (Feed on fluids such as blood or plant nectar.)
- E. **Bulk feeders** (Humans and most other animals) (Bulk refers to “large quantities at one time”.)

VII Food processing basics:

- A. **Ingestion** - This is the putting of food *in the mouth*.
- B. **Digestion** - This is *the breakdown of food*.; **indigestion** - This refers to trouble breaking down food.
 - 1. Accomplished through *enzymatic hydrolysis* primarily.
 - 2. Aided by mechanical (grinding/chewing) digestion as well.
- C. Food molecules then undergo absorption into the circulatory system or diffusion into the surrounding tissues.
- D. Elimination of waste (about 10% of what is eaten) occurs at the end of the tract (anus) or out the mouth/anus for primitive animals.

VIII. Where Digestion Occurs:

- A. It starts as a single opening osculum (sponges) evolves over time into a single opening mouth/anus of a gastrovascular cavity (Cnidarians and Platyhelminthes)
- B. Gastrovascular cavities evolved into a two opening digestive tracts (A.K.A. **Alimentary Canal**) over millions of years. (As seen in all other phyla of animals.)
 - 1. Organs of the digestive tract:
 - a. **Mouth/Teeth** - Starts digestion by breaking food up into smaller pieces.
 - b. **Pharynx** - This muscular tube sucks food up into the tract.
 - c. **Esophagus** - This structure lubricates food for passage through the tract.
 - d. **Crop** (food storage) □ These two become one organ - **stomach**
 - e. **Gizzard** (food breakdown) □
 - f. **Small intestines** - This organ finishes food breakdown and also food absorption.
 - g. **Large intestines** - This organ is for waste collection and water reabsorption.
 - h. **Anus** - Where waste material exits the body.

IX. **Adaptations to the digestive tracts of Mammals:**

- A. Teeth types – related to diets (Just like beaks for birds.)
- B. Increased stomach size for carnivores.
- C. Length of digestive tract – Carnivores have short digestive tracts; herbivores have long digestive tracts.
- D. **Rumens** in herbivores - This structure contains cellulose digesting bacteria. (Animals are ruminants.)(They chew cud.)