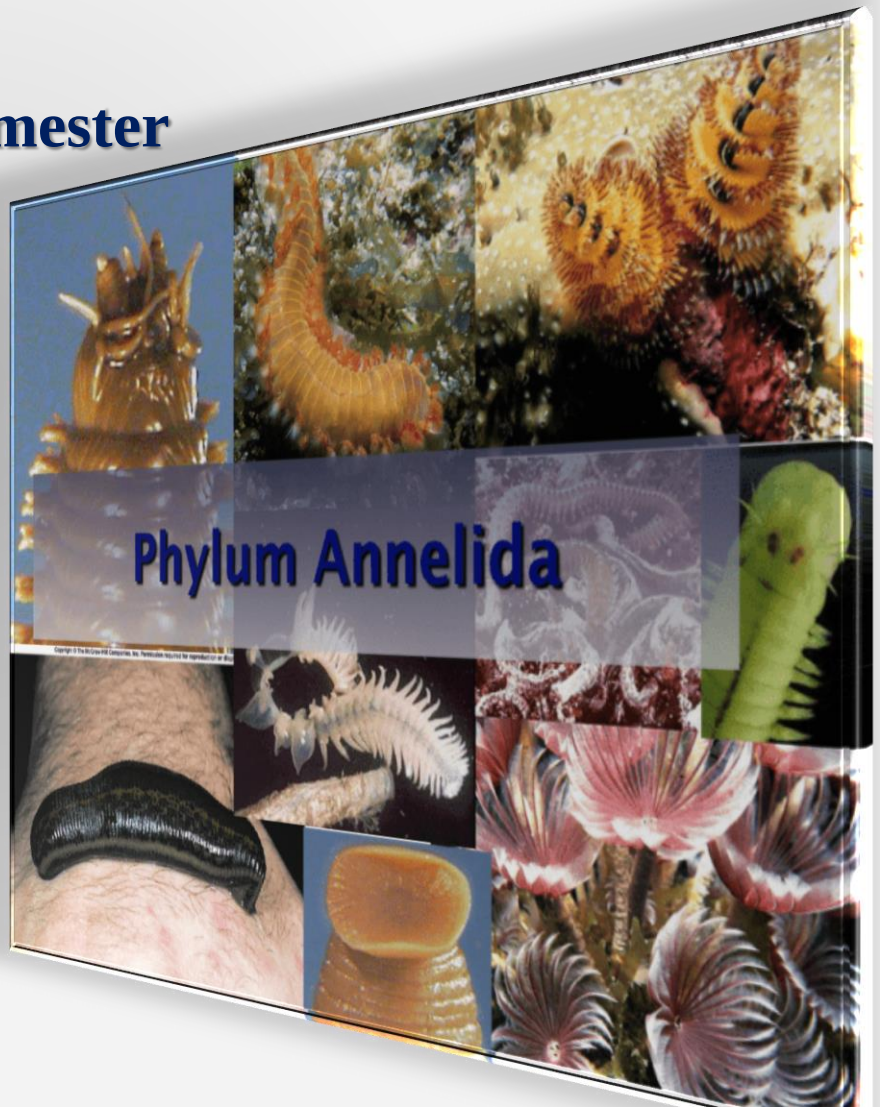
NON-CHORDATES II: COELOMATES

Unit-II

(Annelida)

B.Sc. 2nd Semester



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Introduction

- Annelida is a phylum of invertebrate animals that includes segmented worms. The name "Annelida" comes from the Latin word "annulus", which means "little ring", and refers to the segmented appearance of these animals.
- Annelids are found in a wide variety of habitats, including freshwater, marine environments, and damp soil.
- They range in size from just a few millimeters to over three meters in length and exhibit a wide variety of body shapes and colors.
- The body of an annelid is typically divided into a series of repeating segments, or metameres, which are separated by internal septa.
- Each segment contains a set of organs and structures, including muscles, nerves, and blood vessels, which control movement and other functions.
- Annelids have a closed circulatory system, meaning that their blood is contained within vessels and does not flow freely through the body cavity.
- Annelids are also known for their ability to regenerate lost body parts, including segments and even entire individuals in some cases.
- Some annelids are also capable of asexual reproduction through fragmentation, where a portion of the body breaks off and develops into a new individual.

General Characteristics of Annelids:

- Annelids are a diverse group of invertebrate animals that share several general characteristics:
- Segmentation: Annelids have a segmented body with repeating units, or metameres, separated by internal septa.
- This segmentation is called metamerism and is a defining characteristic of the phylum.
- Coelom: Annelids have a true coelom, a fluid-filled body cavity that is lined with mesoderm.
- The coelom provides space for the development and movement of internal organs.
- Nervous system: Annelids have a centralized nervous system with a ventral nerve cord that runs the length of the body.
- The nervous system includes a brain and paired ganglia in each segment.
- Circulatory system: Annelids have a closed circulatory system with a dorsal and ventral vessel that run the length of the body.
- Blood is contained within vessels and does not flow freely through the body cavity.
- Respiratory and excretory systems: Annelids have a variety of respiratory and excretory systems depending on the species.
- Some annelids have gills, while others use their skin for gas exchange.
- Excretion is typically carried out by specialized structures called nephridia.
- Reproduction: Annelids have a variety of reproductive strategies, including sexual and asexual reproduction.
- Many species are hermaphroditic, meaning that they have both male and female reproductive organs.

Classification of Annelids:

The phylum Annelida is divided into three major classes, each with distinct characteristics and ecological roles:

- **Polychaeta:** This class includes marine worms that are often brightly colored and have bristles called chaetae on each segment. Polychaetes are ecologically important as food sources for other animals and as decomposers, breaking down organic matter on the seafloor. They also play important roles in nutrient cycling in marine ecosystems.
- **Oligochaeta:** This class includes earthworms and other freshwater and terrestrial worms. Oligochaetes are important decomposers in soil ecosystems and help to maintain soil fertility. They also play a role in mixing and aerating soil, which can improve its structure and water-holding capacity.
- **Hirudinea:** This class includes leeches, which are found in both freshwater and terrestrial habitats. Leeches are characterized by their flattened body shape and suction-cup-like mouths. Some species of leeches are used in medicine for their anticoagulant properties, while others are used in traditional medicine practices.

Excretion in Annelida:

- Excretion is the process of removal of nitrogenous waste which are produce during metabolism.
- In Annelida excretion takes place by means of minute coiled tubes which are segmentally arrange is called Nephridia.
- Nephridia are internally ciliated and open in the coelom through an opening called Nephrostome that receives body fluid.
- The cells of the Nephridia separate the waste products by way of ultrafiltration from the haemocoelomic fluid.
- The Nephridia also remove the excess of water from the body and thereby regulating the osmotic pressure of the haemocoelomic fluid.
- The excretory fluid flows through the central canal and is finally collected into the terminal vesicle and then discharged to the exterior through the Nephridiopores.
- Aquatic species excrete ammonia and terrestrial species excretes urea.

Functions of nephridia:

- Nephridia help in excretion of nitrogenous waste products from the body to the exterior.
- They help in maintaining water balance of the body.
- It helps in regulating the osmotic balance.
- They secondarily help in reproduction. In some cases, they act as gonoducts.

Physiology of Excretion:

- Nephridia help in the removal of excretory waste both from blood and coelomic fluid.
- It is richly supplied with blood vessels.
- The dissolved nitrogenous waste from blood diffuses into the lumen of the nephridia from where they move to the nephridial ducts.
- As the fluid travels through these tubes, nutrients and water are reabsorbed while the concentrated waste fluid is released directly to the exterior by nephridiopores or into alimentary canals.
- Water is reabsorbed through the wall of the alimentary canal and again utilized by the animal.
- Thus, excessive loss of water is checked by the enteronephric system which is advantageous to the animal found in dry condition.
- Nephrostome found in Metanephridia, is the funnel by which the nephridia communicate with the coelom. By the ciliary action of the nephrostome and tubules, the nitrogenous waste is drawn into the nephridia from the coelom and passed out.


Thank you