

# BIO 102

## General Biology II

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### PHYLUM ANNELIDA

Unlike the nematodes and the earlier animal groups, animals from annelids onwards

- Have developed **fluid-filled coelom**
  - Coelomic fluid separate the body wall from the alimentary tract.
  - The majority of the mesoderm which lines the coelom develops into muscle
  - Muscle of the body wall aids locomotion of the whole animal while that of the gut causes peristalsis of food.
  - Transport of materials between the gut wall and the body wall is achieved by a well-developed blood vascular system

## Characteristics features of the Annelids

- They are triploblastic
  - They are coelomate
    - The coelom of the of the annelid provides a form of hydrostatic skeleton against which its muscles could act during locomotion and burrowing
  - They are bilaterally symmetrical
  - They are metamerically segmented
  - They have central nervous system of paired supra-oesophageal ganglia connected to ventral nerve cord by commissures
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- The annelid body typically has a two-part head, composed of a **prostomium** and a **peristomium** followed by a segmented body
  - They have solid nerve cord, usually double with segmented nerves
  - Excretory organs are segmental, ectodermal in origin, ciliated and called **nephridia**
  - They have definite cuticle secreted by ectoderm
  - They have chaetae of chitin arranged segmentally (except in leeches)
  - Larva are typically a trochophore
  - Respiratory gas exchange through skin, **gills, or parapodia**
  - **Closed circulatory system with muscular blood vessels** and aortic arches (hearts) for pumping blood

**The phylum is divided into three classes:**

- Class Polychaeta
- Class Oligochaeta
- Class Hirudinea

### **Class Polychaeta**

- The largest class of annelids is the Polychaeta with more than 10,000 species,
- Most of them are marine dwellers.
- Although most polychaetes are 5 to 10 cm long, some are less than 1 mm, and others may be as long as 3 m.
- Many polychaetes live under rocks, in coral crevices, or in abandoned shells. A number of species burrow into mud or sand and build their own tubes on submerged objects or in bottom sediment.

- They play a significant part in marine food chains because they are eaten by fish, crustaceans, hydroids, and many other predators.
  - Polychaetes differ from other annelids in having a **well differentiated head** with specialized sense organs; paired appendages, called **parapodia**, on most segments; and no clitellum
  - They have many setae, usually arranged in bundles on the parapodia.
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- Polychaetes are often divided into two morphological groups based on their activity
- 1. Sedentary polychaetes:**
    - Sedentary polychaetes spend much or all of their time in tubes or permanent burrows.
    - Many of them, especially those that live in tubes, have elaborate devices for feeding and respiration
  - 2. Errant polychaetes (free moving):**
    - These include free-swimming pelagic forms, active burrowers, crawlers, and tubeworms that only leave their tubes for feeding or breeding.
    - Example include clam worms in the genus *Nereis* which are predatory and equipped with jaws or teeth to capture prey

## Other characteristics

- Sedentary polychaetes feed on suspended particles, or they may be deposit feeders, consuming particles on or in the sediment.
- Errant polychaetes are typically predators and scavengers.
- Polychaetes usually have separate sexes.
- Fertilization is external, and the early larva is called a **trochophore**
- Examples include *Nereis*, *Aphrodita*, *Glycera*, *Arenicola*, *Chaetopterus*, *Amphitrite*, *Riftia*.

## Class Oligochaeta

- They include the familiar earthworms and many species that live in freshwater.
- Most are terrestrial or freshwater forms, but some are parasitic, and a few live in marine or brackish water.
- Setae are less numerous in oligochaetes than in polychaetes
- There are no parapodia
- Most oligochaetes are scavengers.
- Earthworms feed mainly on decaying organic matter, bits of leaves and vegetation, refuse, and animal matter.

- Osmoregulation occurs as a function of the body surface and the nephridia, as well as the gut and dorsal pores.
  - Salts as well as water passes across the integument; salts apparently being actively transported.
  - Earthworms are monoecious (hermaphroditic); both male and female organs are found in the same animal
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- Examples include *Lumbricus*, *Stylaria*, *Aelosoma*, *Tubifex*

## ***Class Hirudinea: Leeches***

- Leeches occur predominantly in freshwater habitats, but a few are marine, and some have even adapted to terrestrial life in warm, moist places.
  - They are more abundant in tropical countries than in temperate zones.
  - Body with fixed number of segments (normally 34; 15 or 27 in some groups)
  - There are no parapodia
  - Many leeches live as carnivores on small invertebrates; some are temporary parasites; and some are permanent parasites, never leaving their host.
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- They have lost the setae used by oligochaetes in locomotion and have developed **suckers** for attachment while sucking blood
  - Aquatic leeches swim with an undulatory movement.
  - Leeches are popularly considered parasitic, active predators or scavengers
  - Most leeches are fluid feeders. Many prefer to feed on tissue fluids and blood pumped from open wounds.

- Some freshwater leeches are true bloodsuckers, preying on cattle, horses, humans, and other mammals.
- An example of the true bloodsuckers include the medicinal leech, *Hirudo medicinalis*
- Gas exchange occurs only through the skin except in some fish leeches, which have gills.
- Leeches are hermaphroditic but cross-fertilize during copulation.
- Examples include *Hirudo*, *Placobdella*, *Macrobdella*